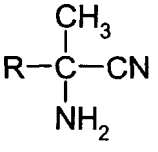
02 June 2006

ROBUST SUMMARY FOR AMINOALKYLNITRILE CATEGORY

Summary

For purposes of this HPV submission, the aminoalkylnitrile category is composed of two chemicals with two functional groups, an amino group and a nitrile group, both of which are bonded to the same carbon atom. This carbon atom also bears a methyl group and another alkyl group. This category is composed of discrete materials that change by an incremental increase in carbon number in the alkyl moiety. The aminoalkylnitriles included in this HPV category are 2-amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile. The next higher homologue, 2-amino-2,3-dimethylbutanenitrile has been the subject of a separate HPV submission. Because of the close similarity in the structure and properties of this homologue, it will be considered as a supporting analog, and data on this analog are used to supplement data for the aminoalkylnitrile category.

For purposes of this HPV document, the aminoalkylnitrile chemicals can be represented by the general structural formula:



Information regarding these chemicals is presented in the table below.

Chemical Name	CAS Registry Number	R =
Propanenitrile, 2-amino-2-methyl-	19355-69-2	CH_3- (Category Member)
Butanenitrile, 2-amino-2-methyl-	4475-95-o	CH_3CH_2- (Category Member)
[redacted]		

The members of this category are produced solely by DuPont, as company-limited intermediates for the synthesis of the corresponding azonitriles, 2,2'azobis-(2-isobutyronitrile) (AIBN) (CAS # 78-67-l) and 2,2'azobis-(2-methylbutyronitrile) (AMBN) (CAS #13472-08-7). An HPV submission was made to EPA for AMBN, and in this submission AIBN was proposed as an analog to provide data to support AMBN. Because of the similar molecular structures, comparable effects data, and expected similar metabolic pathway, EPA agreed that AIBN is an acceptable analog for AMBN. We believe that similar considerations also justify treating 2-amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile as members of an HPV

category, and justify using data for 2-amino-2,3-dimethylbutanenitrile to support this aminoalkylnitrile category.

The scientific literature was searched and summarized. Data were identified for the two materials in the category and the analogous substance (Table 1). Each study on category materials was evaluated for adequacy. EPA has already evaluated the HPV submission for the supporting analog. Robust summaries were developed for each study addressing specific SIDS endpoints. Summaries were also developed for studies that were either considered not adequate but provided information of relevance for hazard identification and evaluation, or covered non-SIDS endpoints (Appendices A-C).

Table 1: Matrix of Available and Adequate Data for Aminoalkylnitrile Category

	Propanenitrile, 2-amino-2-methyl- (Category Member)	Butanenitrile, 2-amino-2-methyl- (Category Member)	
R =	CH_3-	CH_3CH_2-	
PHYSICAL/CHEMICAL CHARACTERISTICS			
Melting Point	√/–	√/–	
Boiling Point	√/–	√/–	
Vapor Pressure	√/–	√/–	
Partition Coefficient	√	√	
Water Solubility	√/–	√/–	
ENVIRONMENTAL FATE			
Photodegradation	√	√	
Stability in Water	√/–	√/–	
Transport (Fugacity)	√	√	
Biodegradation	√/–	√/–	
ECOTOXICITY			
Acute Toxicity to Fish (96-hour LC_{50})	√	√	
Acute Toxicity to Invertebrates (48-hour EC_{50})	√	–	
Acute Toxicity to Aquatic Plants	–	–	
MAMMALIAN TOXICITY			
Acute Toxicity	√	√	
Repeated Dose Toxicity	√/-	–	
Developmental Toxicity	–	–	
Reproductive Toxicity	–	–	
Genetic Toxicity Gene Mutations	–	–	
Genetic Toxicity Chromosomal Aberrations	–	–	

√ = Data are available and considered adequate.
√/– = Data are available, but considered inadequate.
– = No data available.
N/A = Not Applicable.

All three nitriles have roughly equivalent physical chemical properties (Table 2). Molecular weights range from 84.12 to 112.17. They are all liquids at room temperature, with melting points ranging from -4.7 to 7.7°C, and all three decompose with heat. Since the estimated melting point values was above 0°C for 2-amino-2-methylbutanenitrile was above 0°C and the value for 2-amino-2-methylpropanenitrile was only slightly below 0°C, measuring melting points of these 2 chemicals following OECD Guideline 102 is recommended. In addition, the test samples will be observed for evidence of decomposition during the melting point measurement. Measured vapor pressure values are 30 mm Hg at 66°C, 14 mm Hg at 68°C, and 23.42 mm Hg at 25°C for and 2-amino-2,3-dimethylbutanenitrile, respectively. Estimated vapor pressures are also included at the standard temperature of 25°C, where measured data at this temperature were not available. Although measured values for vapor pressure are supplied, no additional data regarding the testing of this endpoint were available. Therefore, vapor pressure studies for 2-amino-2-methylbutanenitrile and 2-amino-2-methylpropanenitrile following OECD Guideline 104 are recommended, contingent upon the technical feasibility of obtaining test material of sufficient purity and stability for running these studies. Estimated vapor pressures were used when needed in modeling environmental fate data. Although no density was reported for 2-amino-2,3-dimethylbutanenitrile, the density for 2-amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile are similar, with values of 0.9 and 0.886, respectively. Partition coefficients are similar with estimated values of -0.04, -0.25, and 0.87 for 2-amino-2-methylpropanenitrile, 2-amino-2-methylbutanenitrile, and 2-amino-2,3-dimethylbutanenitrile, respectively. All three aminoalkylnitriles show appreciable water solubility with values greater than or equal to 27 g/L. Additional information regarding the water solubility of 2-amino-2-methylbutanenitrile and 2-amino-2-methylpropanenitrile will be determined in conjunction with testing of stability in water. The available data show similarity between the three nitriles for physical and chemical characteristics, thus supporting the category approach. **Additional testing for physical/chemical characteristics recommended for 2-amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile include melting point (OECD Guideline 102), boiling point (decomposition data), vapor pressure (OECD Guideline 104, contingent upon technical feasibility of running the studies), and water solubility (data to be collected in conjunction with testing of stability in water).**

Table 2: Physical and Chemical Characteristics

	Propanenitrile, 2-amino-2-methyl-	Butanenitrile, 2-amino-2-methyl-
Physical Appearance	Brown liquid with an ammonia-like odor	Yellow liquid with an ammonia-like odor
Molecular Weight	84.12	98.15
Water Solubility		27.0 g/L
Melting Point	-4.7°C	7.1°C
Boiling Point	Decomposes	Decomposes
Vapor Pressure	30 mm Hg @ 66°C (measured) 4 mm Hg @ 20°C (measured) 2.84 mm Hg @ 25°C (estimated)	14 mm Hg @ 68°C (measured) 1.03 mm Hg @ 25°C (estimated)
Density/ Specific Gravity	0.9 @ 25°C	0.886
Partition Coefficient (log Kow)	-0.04 (estimated)	0.45 (estimated)

Members of the aminoalkyhritrile category have similar environmental fate behavior (Table 3). At acidic to neutral environmental pH, all three aminoalkylnitriles may be ionized due to the presence of the amino group, then subject to cation exchange reactions. Although somewhat volatile, with vapor pressures above 0.1 mm Hg (Table 2), they have Henry's Law constants less than so there will be a tendency to rain out of the atmosphere and not to volatilize from surface waters. Based on the atmospheric oxidation models, the two substances in the category have estimated half-lives of greater than 10 days, due to hydroxyl radical oxidation. The category analog is subject to the same oxidation mechanism, but with a higher hydrogen:carbon ratio is oxidized more rapidly, with an estimated half-life of 1.85 days. All three aminoalkylnitriles show appreciable water solubility with values greater than or equal to 27 g/L (Table 2). They are likely to be unstable in water, however, because they show a tendency to disproportionate to the corresponding ketone, cyanide, and ammonium when dissolved in water in the absence of excess ammonia (Kirk-Othmer, 1978). Measured stability in water testing for 2-amino-2-methyl-propanenitrile and 2-amino-2-methylbutanenitrile following OECD Guideline 111 is recommended. Biodegradation is estimated to be fast for

2-amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile. Because of the presence of a dimethyl group, the model estimates that the supporting analog is not as readily biodegradable. Since no measured biodegradation data is available, biodegradation testing following OECD Guideline 301B or 302B is recommended for 2-amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile, dependent upon the results of the stability in water testing. Substances degraded by water alone would also be expected to degrade at the same rate or faster in biologically active soil in the presence of water. Therefore, biodegradation testing is recommend only if the results of the stability in water testing at pH 7.0 demonstrate half-lives of the parent chemicals are greater than 38 days. The category shows little tendency to bioaccumulate based on low estimated BCF values. Consistent with behavior described above, and assuming equal emissions to air, water, and soil, any residual of the aminoalkylnitrile category is expected to be distributed primarily in water and soil, based on the Mackay Level III fugacity model. Therefore, with regard to expected environmental distribution, the aminoalkylnitriles behave in a similar manner, justifying their classification as a category. **Additional testing for environmental fate recommended for 2-amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile include stability in water (OECD Guideline 111) and biodegradation (dependent upon results of stability in water).**

Table 3: Environmental Fate

	Propanenitrile, 2-amino-2-methyl-	Butanenitrile, 2-amino-2-methyl-
Bioaccumulation*	log BCF = 0.5	log BCF = 0.5
Biodegradation*	Readily degradable	Readily degradable
Fugacity*	Air 1% Water 45.9% Soil 53.9% Sediment 0.089%	Air 0.1% Water 44.8% Soil 55% Sediment 0.09%

Modeled data.

The nitriles are moderately to highly toxic to aquatic life (Table 4). 2-Amino-2-methyl propane&rile, 2-amino-2-methylbutanenitrile, and 2-amino-2,3-dimethylbutanenitrile are highly toxic to fish with a 96-hour LC_{50} of 0.71 to 0.75 and 2-amino-2,3-dimethylbutanenitrile are moderately toxic to *Daphnia* with 48-hour EC_{50}'s of 6.9 and 7.1 mg/L, respectively. 2-Amino-2,3-dimethylbutanenitrile is highly toxic to algae with a 96-hour EC_{50} of 0.36 mg/L. The three chemicals appear to have somewhat similar toxicity to the individual species. Some differences exist, with algae appearing to be more sensitive than fish or invertebrates. The available data are similar for all three nitriles, supporting the category approach for ecotoxicity. **Since the database indicates that there is strong agreement in aquatic toxicity across the category and analog chemicals, and data exists for each study type, no additional ecotoxicity testing is recommended.**

Table 4: Ecotoxicitv

	Propanenitrile, 2-amino-2-methyl-	Butanenitrile, 2-amino-2-methyl-	
Toxicity to Fish (96-hour LC_{50} value)	0.71 mg/L (N) 468.3 mg/L (E)	0.71 mg/L (N) 744.5 mg/L (E)	
Toxicity to Invertebrates (48-hour EC_{50} value)	7.1 mg/L (N) 26.6 mg/L (E)	41.1 mg/L (E)	
Toxicity to Algae (96-hour EC_{50} value)	24.8 mg/L (E)	35.7 mg/L (E)	

N = value based on nominal test concentrations
E = estimate value; log Kow values used in the ECOSAR model are listed in Table 2.

Acute toxicity data indicate that the three chemicals exhibit similar acute toxicity (Table 5). 2-Amino-2-methylpropanenitrile is very toxic to mammals with an oral LD_{50} in rats of 1 O-30 mg/kg; while 2-amino-2-methylbutanenitrile and 2-amino-2,3-dimethylbutanenitrile are toxic with oral LD_{50}s of 74 and 83 mg/kg, respectively. All three chemicals are toxic via the inhalation route with a l-, 2-, and/or 4-hour ALC (approximate lethal concentration) or LC_{50} ranging from 7 1 - 111 ppm. Dermally, 2-amino-2-methylpropanenitrile and 2-amino-2,3-dimethylbutanenitrile are very toxic with an ALD (approximate lethal dose) and LD_{50} in rabbits of 30-100 and 23 mg/kg, respectively. The test substances produced slight to mild skin irritation. 2-Amino-2-methylpropanenitrile and 2-amino-2,3-dimethylbutanenitrile produced mortality when tested in rabbit eyes. 2-Amino-2-methylbutanenitrile did not cause death of rabbits, but was a severe eye irritant. 2-Amino-2-methylbutanenitrile was not a skin sensitizer when tested in guinea pigs. No data regarding the acute dermal toxicity of 2-amino-2-methylbutanenitrile, or dermal sensitization potential of 2-amino-2-methylpropanenitrile and 2-amino-2,3-dimethylbutanenitrile were available. The available acute toxicity data are similar for the three nitriles, thus supporting the category approach for acute toxicity. **All required SIDS acute toxicity data points are complete for the category, and no further acute mammalian testing is recommended.**

Table 5: Acute Mammalian Toxicity

	Propanenitrile, 2-amino-2-methyl-	Butanenitrile, 2-amino-2-methyl-
Oral LD_{50} (rat)		74 mg/kg
Inhalation (rat)	2- and 4-hour ALC (rats) = 71 ppm	1 -hour LC_{50} (male rats) = 111 ppm 1 -hour LC_{50} (female rats) = 104 ppm 1 -hour LC_{50} (rats – combined sexes) = 107 ppm
Dermal (rabbit)	ALD = 30-100 mg/kg	No Data
Dermal Irritation	Slight to mild	Slight
Eye Irritation	Death	Severe
Dermal Sensitization	No Data	Not a sensitizer

A summary of the available data on repeated dose, developmental, and reproductive toxicity is shown in Table 6. Repeated administration of 2-amino-2-methylpropanenitrile to rats via inhalation for 2 weeks at vapor concentrations of 0, 1.4, 7.3, or 22 ppm produced neither deaths nor differences in body weights or clinical observations. In addition, no toxicologically significant changes in hematology, clinical chemistry, urine analysis, organ weight, gross observations, or microscopic observations were seen. The NOEL for the study was 22 ppm. 2-Amino-2,3-dimethylbutanenitrile was tested in a 28-day dermal study in rats at doses of 3, 10, and 30 mg/kg. Although increased thyroid weights were observed at all dose levels, no pathologic changes to account for this finding were observed. Based on skin irritation observed at $\geq$ 10 mg/kg, the NOEL was 3 mg/kg. However, the authors state that the intent of the repeated exposure dermal study was to assess systemic toxicity, and since no evidence of systemic toxicity was observed, the NOEL for systemic toxicity for the study was 30 mg/kg. No effects were observed in the reproductive organs (testes, epididymides, prostate, and seminal vesicle) of the male rats treated with 2-amino-2-methypropanenitrile for 2 weeks or in male and female rats (testes and uterus) treated with 2-amino-2,3-dimethylbutanenitrile for 28 days. **Since no data are available regarding developmental or reproductive toxicity, a repeat**

dose/developmental/reproductive toxicity screening test with 2-amino-2-methylpropanenitrile following OECD guideline 422 is recommended.

Table 6: Repeated Dose, Developmental, and Reproductive Toxicitv

	Propanenitrile, 2-amino-2-methyl-	Butanenitrile, 2-amino-2-methyl-	[redacted]
Repeated Dose Toxicity (NOAEL)	2-week inhalation (rats) NOEL =	N/A	
Developmental Toxicity	No Data	No Data	
Reproductive Toxicity	No Data	No Data	

No information was found regarding genetic toxicity for 2-amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile. 2-Amino-2,3-dimethylbutanenitrile was not mutagenic when tested in an Ames assay with *Salmonella typhimurium,* with and without exogenous metabolic activation. **Since no data are available regarding the clastogenic effects of the category members or the analog chemical, a chromosome aberration study with 2-amino-2-methylpropanenitrile following OECD guideline 473 is recommended.**

Table 7: Genetic Toxicitv

	Propanenitrile, 2-amino-2-methyl-	Butanenitrile, 2-amino-2-methyl-	[redacted]
Mutagenic	No Data	No Data	
Clastogenic	No Data	No Data	

Human Exposure

2-Amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile are DuPont-limited intermediates. These two aminoalkymitriles are manufactured at one DuPont plant and are shipped by DOT 412 tank truck to another DuPont facility for conversion into the corresponding (AIBN) and 2,2'azobis-(2-methylbutyronitrile) (AMBN). The aminoalkymitriles are not sold to third parties and are not consigned to toll manufacturers for conversion to the final products.

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The aminoalkylnitriles are produced in a closed system using ammonia, the appropriate ketone (acetone or 2-butanone), and HCN. The aminoalkylnitriles are hard piped to dedicated storage tanks and stored under an ammonia blanket. Off-gases associated with the aminoalkylnitrile process are vented to a flare stack. Each batch is sampled during manufacture and each storage tank is sampled daily and before loading. All sampling is done using a closed system that utilizes a container with a septum seal on the top with a needle type injector to prevent human exposure to both liquid and vapors. Sample analysis is conducted in a ventilated laboratory hood. Each aminoalkylnitrile has a required percentage of excess ketone for product quality control. The excess ketone is used as a marker for potential exposure during personnel air monitoring at the manufacturing site, since it is more volatile than the corresponding aminoalkylnitrile.

During loading at the manufacturing site, the trailer and the storage tank are connected to form a closed system to prevent exposure. Flex hose is connected to the liquid valve on the trailer and the liquid is fed through an induction pipe to the bottom of the trailer. The aminoalkylmtrile in liquid form is pumped into the trailer and the vapor from the container is vented back, through a separate vent line, into the storage tank that is being emptied. Both lines are purged before disconnecting from the trailer. There is no operator exposure during the loading operation.

Safety equipment used depends on the task being performed. During routine monitoring of manufacturing operations, operators wear chemical goggles, a hard hat, and full-body Nomex® garments. In the course of laboratory work in a vented hood, safety glasses with sideshields and rubber gloves are worn. During loading operations at the manufacturing site, operators wear appropriate personal protective equipment to protect themselves from liquid and vapor contact while on the trailer. PPE consists of Nomex® clothing, hardhat, chemical splash goggles, HCN personal monitor, radio, and neoprene gloves. Safety showers, eyewash stations and self-contained breathing apparatus (SCBA) are available in close proximity to the operations area. All first breaks into equipment that cannot be confirmed as having been decontaminated require, at a minimum, the use of a full acid suit and self-contained breathing apparatus (SCBA), such as the Scott Air Pack or air-line respirators.

At the DuPont use site, aminoalkylnitrile tank trucks are close-dome unloaded under a nitrogen blanket, and may be vented to a flare as needed. The stainless steel storage tanks and associated piping are designed to code to contain the aminoalkylnitrile, and have redundant hi-hi level interlocks to prevent overfilling. The aminoalkylnitrile is pumped through an air stripper to remove excess ammonia. The air exiting the stripper is routed to a flare. The stripped liquid aminoalkylnitrile flows to a reactor below liquid level and is completely converted to the corresponding Vazo® product in the subsequent reaction.

During unloading of the aminoalkylnitrile tank trucks at the DuPont use site, operators wear personal protective equipment consisting of neoprene chemical gloves sealed to an acid suit, boots, acid hood, and air supplied positive pressure respirator. During sampling of aminoalkylnitriles, chemical gloves and chemical acid hood are required. Safety showers, eyewash stations and self-contained breathing apparatus (SCBA) are available in close proximity to the operations area.

The DuPont Acceptable Exposure Limit (AEL) for acetone in 2-amino-2-methylpropanenitrile is 500 ppm as an 8- and 12-hour TWA (time-weighted average); the AEL for 2-butanone in 2-amino-2-methylbutanenitrile is 200 ppm as an 8- and 12-hour TWA. Air monitoring at the manufacturing site has shown that ketone concentrations are well below their respective AELs. At the use site, air monitoring is conducted for the aminoalkylnitriles per se. Levels of the aminoalkylnitriles measured in short term air monitoring during unloading operations have been consistently below 0.5 ppm, the limit of quantitation, and well below the DuPont AEL for 2-amino-2-methylpropanenitrile, which is 5 ppm (15-minute TWA). Results are shown in the table below:

Exposure Data:

Job Sampled	No. of Results	Average (ppm)	Minimum (ppm)	Maximum (ppm)
DuPont Manufacturing Site Operators (full shift) – acetone	6	<0.82	0.75	1.04
DuPont Manufacturing Site Operators (full shift) – 2-butanone	6	<0.81	0.67	1.56
DuPont End Use Site Operators during unloading of aminoalkylnitrile – as 2-amino-2-methylpropanenitrile or 2-amino-2-methylbutanenitrile	23	All < 0.5		

Conclusion

2-Amino-2-methylpropanenitrile and 2-amino-2-methylbutanenitrile may be considered as members of an HPV category based on the similarities in their molecular structures, reactivity, use, physical/chemical characteristics, and hazards. These two substances are nearest homologues and have the same functional groups. The use of supporting data from the next higher homologue, 2-amino-2,3-dimethylbutanenitrile, is consistent with the Agency's directive to HPV participants to maximize the use of scientifically appropriate data for related chemicals. Although some chemical and biological differences among these homologues may be expected, we believe these differences are minor. Generation of the additional data noted in the following test plan should be adequate to complete the HPV characterization of both members of the aminoalkylnitrile category.

Table 8: 2-Aminoalkylnitrile Category Proposed SIDS Test Plan

	Propanenitrile, 2-amino-2-methyl-	Butanenitrile, 2-amino-2-methyl-
Melting Point	Y	Y
Boiling Point	N[a]	N[a]
Vapor Pressure	Y[b]	Y[b]
Water Solubility	C	C
Stability in Water	Y	Y
Biodegradation	d	d
Repeated Dose/Reproductive/ Developmental Toxicity Screen	Y	N
Genetic Toxicity Chromosomal Aberrations	Y	N

[a] The test samples will be observed for evidence of decomposition during melting point measurement.
[b] The commitment to perform these studies is contingent upon the technical feasibility of running these studies.
[c] Information to be determined in conjunction with testing of stability in water.
[d] Need for performing these studies will be determined based on results of the stability in water testing.

Reference for Summary

Kirk-Othmer Encyclopedia of Chemical Technology (1978). 3rd edition, Wiley-Interscience.

IUCLID

Data Set

Existing Chemical	:	ID: 4475-95-0
CAS No.	:	4475-95-0
Substance name	:	Butanenitrile, 2-amino-2-methyl-
EC No.	:	224-752-6
Molecular Formula	:	C5H10N2

Producer related part

Company	:	E. I. du Pont de Nemours and Company
Creation date	:	09.02.2006

Substance related part

Company	:	E. I. du Pont de Nemours and Company
Creation date	:	09.02.2006
Status	:	
Memo	:	
Printing date	:	02.06.2006
Revision date	:	
Date of last update	:	24.05.2006
Number of pages	:	25
Chapter (profile)	:	Chapter: 1, 2, 3, 4, 5, 6, 7, 8, 10
Reliability (profile)	:	Reliability: without reliability, 1, 2, 3, 4
Flags (profile)	:	Flags: without flag, confidential, non confidential, WGK (DE), TA-Luft (DE), Material Safety Dataset, Risk Assessment, Directive 67/548/EEC, SIDS

1.0.1 APPLICANT AND COMPANY INFORMATION

1.0.2 LOCATION OF PRODUCTION SITE, IMPORTER OR FORMULATOR

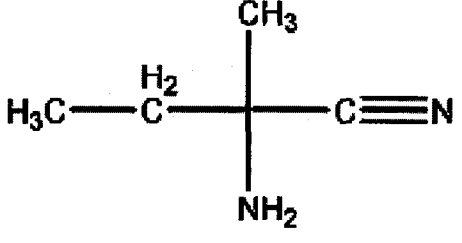
1.0.3 IDENTITY OF RECIPIENTS

1.0.4 DETAILS ON CATEGORY/TEMPLATE

1.1.0 SUBSTANCE IDENTIFICATION

1.1.1 GENERAL SUBSTANCE INFORMATION

Purity type	:	
Substance type	:	
Physical status	:	liquid
Purity	:	
Colour	:	yellow
Odour	:	ammonia-like odor
Attached document	:	4475.bmp



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1.1.2 SPECTRA

1.2 SYNONYMS AND TRADENAMES

1-Cyano-1-methylpropylamine

09.02.2006

2-Amino-2-methylbutanenitrile

09.02.2006

2-Amino-2-methylbutyronitrile

09.02.2006

Isovalinonitrile

09.02.2006

Vazo 67 aminonitrile

09.02.2006

1.3 IMPURITIES

1.4 ADDITIVES

1.5 TOTAL QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.6.3 PACKAGING

1.7 USE PATTERN

1.7.1 DETAILED USE PATTERN

1.7.2 METHODS OF MANUFACTURE

1.8 REGULATORY MEASURES

1.8.1 OCCUPATIONAL EXPOSURE LIMIT VALUES

1.8.2 ACCEPTABLE RESIDUES LEVELS

1.8.3 WATER POLLUTION

1.8.4 MAJOR ACCIDENT HAZARDS

1.8.5 AIR POLLUTION

1.8.6 LISTINGS E.G. CHEMICAL INVENTORIES

1.9.1 DEGRADATION/TRANSFORMATION PRODUCTS

1.9.2 COMPONENTS

1.10 SOURCE OF EXPOSURE

1.11 ADDITIONAL REMARKS

1.12 LAST LITERATURE SEARCH

1.13 REVIEWS

2.1 MELTING POINT

Value	:	7.1 °C
Sublimation	:	
Method	:	
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. MPBPWIN, v.1.41, module of EPIWIN 3.11 (Syracuse Research Corporation). MPBPWIN estimates melting point by 2 different methods. The first is an adaptation of the Joback group contribution method for melting point (Joback, 1982; Reid et al., 1987) and the second is a simple Gold and Ogle method suggested by Lyman,1985.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	Value at 760 mm Hg
09.02.2006		(14) (16) (27)
Remark	:	Additional Reference for Melting Point
17.02.2006		(9)

2.2 BOILING POINT

Decomposition	:	yes
Method	:	
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Not assignable because limited study information was available.
15.05.2006		(9)

2.3 DENSITY

Type	:	relative density
Value	:	.886 at °C
Method	:	
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Not assignable because limited study information was available.
Result	:	Vapor density >1, where air = 1
15.05.2006		(9)

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value	:	1.03 at 25 °C
Decomposition	:	
Method	:	other (calculated): MPBPWIN v1.40

Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Estimated as the mean of Antoine & Grain methods Syracuse Research Corporation (MPBPWIN v1.40 in EPIWIN v3.11 program) estimates the vapor pressure using the modified Grain method. A description of the methodology is detailed in Lyman, 1985.
Remark	:	Reliability: Estimated value based on accepted model.
15.05.2006		(10) (16)
Value	:	18.66513 hPa at 68 °C
Decomposition	:	
Method	:	
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Estimated value based on accepted model.
Result	:	14 mmHg at 68 degree C (converted to 18.66513 hPa).
09.02.2006		(9)

2.5 PARTITION COEFFICIENT

Partition coefficient	:	octanol-water
Log pow	:	-2.73 at 25 °C
pH value	:	
Method	:	other (calculated): KOWWIN, v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. KOWWIN, v. 1.67, module of EPIWIN 3.11 (Syracuse Research Corporation). KOWWIN uses "fragment constant" methodologies to predict log P. In a "fragment constant" method, a structure is divided into fragments (atom or larger functional groups) and coefficient values of each fragment or group are summed together to yield the log P estimate.
Remark	:	Reliability: Estimated value based on accepted model.
Test substance	:	(SMILES: C(#N)C(N(H)(H)(H)(CL))(C)CC) as ionized salt at environmental pH and high dilution
09.02.2006		(10) (22)
Partition coefficient	:	octanol-water
Log pow	:	.45 at 25 °C
pH value	:	
Method	:	other (calculated): KOWWIN, v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. KOWWIN, v. 1.67, module of EPIWIN 3.11 (Syracuse Research Corporation). KOWWIN uses "fragment constant" methodologies to predict log P. In a "fragment constant" method, a structure is divided into fragments (atom or larger functional groups) and coefficient values of each fragment or group are summed together to yield the log P estimate.
Remark	:	Reliability: Estimated value based on accepted model.
Test substance	:	(SMILES: C(#N)C(N)(C)CC)
09.02.2006		(10) (22)

2.6.1 SOLUBILITY IN DIFFERENT MEDIA

Solubility in	:	Water
Value	:	27 g/l at °C
pH value	:	
concentration	:	at °C
Temperature effects	:	
Examine different pol.	:	
pKa	:	4.9 at 25 °C
Description	:	
Stable	:	
Deg. product	:	
Method	:	other: calculated WSKOWIN v1.41
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Method : Modeled.
Solubility - WSKOWWIN v.1.41, module of EPIWIN 3.11 (Syracuse Research Corporation). Water solubility is estimated from log Kow using molecular weight and molecular fragment correction factors.

Modeled. pKa - SPARC On-line calculator, University of Georgia

Remark : Reliability: Estimated value based on accepted model.
15.05.2006 (24) (26)

Remark : Additional reference for water solubility
15.05.2006 (9)

2.6.2 SURFACE TENSION

2.7 FLASH POINT

Value	:	1.7 °C
Type	:	
Method	:	other: SFCC
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4

Remark : Reliability: Not assignable because limited study information was available.
Result : 1.7°C (autodecomposition ~80°C)
17.02.2006 (9)

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

Result	:	flammable
Method	:	
Year	:	
GLP	:	no data

Test substance : as prescribed by 1.1 - 1.4

Remark : Reliability: Not assignable because limited study information was available.
17.02.2006 (9)

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 DISSOCIATION CONSTANT

2.13 VISCOSITY

2.14 ADDITIONAL REMARKS

3.1.1 PHOTODEGRADATION

Deg. product	:	
Method	:	other (calculated): AOPWIN v1.91
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	Direct Photolysis: No Data Indirect Photolysis: Estimated half-life = 10.8 days, due to OH radical oxidation in the atmosphere. With an estimated vapor pressure of 1.03 mm Hg (25 degree C) 2-amino-2-methylbutanenitrile will exist as a vapor in the atmosphere. Breakdown Products: No Data

15.05.2006 (10) (21)

3.1.2 STABILITY IN WATER

Deg. product	:	
Method	:	other (calculated): HYDROWIN v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. HYDROWIN, v. 1.67 module of EPIWIN v3.11 (Syracuse Research Corporation). HYDROWIN cannot estimate a hydrolysis rate constant for this type of chemical structure.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	% Hydrolyzed: No Data Half-life: In the presence of water and the absence of excess ammonia, aminonitriles may disproportionate into their constituents: ketone, cyanide, and ammonium (Kirk-Othmer, 1978)

15.05.2006 (15) (25)

3.1.3 STABILITY IN SOIL

3.2.1 MONITORING DATA

3.2.2 FIELD STUDIES

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

Type	:	fugacity model level III
Media	:	other: Air, Water, Soil, and Sediments
Air	:	% (Fugacity Model Level I)
Water	:	% (Fugacity Model Level I)
Soil	:	% (Fugacity Model Level I)
Biota	:	% (Fugacity Model Level II/III)

Soil : % (Fugacity Model Level II/III)
Method : other: Mackay, Level III Fugacity Model
Year :

Method : Modeled.

SMILES: C(#N)C(N)(C)CC
Molecular Wt: 98.15
Vapor Pressure: 1.03 mm Hg (MPBPWIN program)
Log Kow: -0.25 (KOWWIN program)

Henry's Law Constant - HENRYWIN v. 3.10 module of EPIWIN v3.11 (Syracuse Research Corporation). Henry's Law Constant (HLC) is estimated by 2 separate methods that yield two separate estimates. The first method is the bond contribution method and the second is the group contribution method. The bond contribution method is able to estimate many more types of structures; however, the group method estimate is usually preferred (but not always) when all fragment values are available.

Koc - Calculated from log Kow by the Mackay Level III fugacity model incorporated into EPIWIN v3.11 (Syracuse Research Corporation).

Environmental Distribution - Mackay Level III fugacity model, in EPIWIN v3.11 (Syracuse Research Corporation). Emissions (1000 kg/hr) to air, water, and soil compartments.

Fugacity - The methodology and programming for the Level III fugacity model incorporated into EPIWIN v3.05 (Syracuse Research Corporation) were developed by Dr. Donald MacKay and coworkers and are detailed in Mackay, 1991; Mackay et al. 1996a; Mackay et al. 1996b.

Remark : Reliability: Estimated value based on accepted model.
Result :

Compartment	% of total distribution	½ life (hours) (advection + reaction)
Air	0.1	696
Water	44.8	900
Soil	55	1800
Sediment	0.09	8100

Absorption Coefficient: Koc = 0.231 (calc by model)

Volatility: Henry's Law Constant = 7.35x10E-9 atm-m3/mole (HENRYWIN program)

15.05.2006 (13) (17) (18) (19) (20)

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

Deg. product :
Method : other: Calculated BIOWIN v4.01
Year :
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method	:	Modeled. BIOWIN, v. 4.01 module of EPIWIN v3.11 (Syracuse Research Corporation). BIOWIN estimates the probability for the rapid aerobic biodegradation of an organic chemical in the presence of mixed populations of environmental microorganisms. Estimates are based upon fragment constants that were developed using multiple linear and non-linear regression analyses.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	Linear Model Prediction: 0.9777 (Biodegrades Fast) Non-Linear Model Prediction: 0.9965 (Biodegrades Fast) Ultimate Biodegradation Timeframe: 2.7122 (weeks to months) Primary Biodegradation Timeframe: 3.5308 (days to weeks) MITI Linear Model Prediction: 0.06429 (readily degradable) MITI Non-Linear Model Prediction: 0.6249 (readily degradable) Breakdown Products: No Data

15.05.2006 (2) (10) (11) (12) (28)

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

Elimination	:	
Method	:	other: calculated BCFWIN v2.15
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. BCFWIN v. 2.15 module of EPIWIN v3.11 (Syracuse Research Corporation). BCFWIN estimates the bioconcentration factor (BCF) of an organic compound using the compound's log octanol-water partition coefficient (Kow) with correction factors based on molecular fragments.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	log BCF = 0.5 (unionized or salt)

15.05.2006 (1)

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	
Species	:	Pimephales promelas (Fish, fresh water)
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC50	:	.71
Method	:	other
Year	:	1992
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study. A 96-hour unaerated, static, acute test using fathead minnows was performed at nominal concentrations of 0, 0.5, 1.0, 50, 500, and 5000 mg/L. Fish were <1 g at study start, and fish loading was <5 g per 4 L test solution. One test chamber per concentration with 5 animals per test chamber were used. The photoperiod was 16 hours light:8 hours dark. Dissolved oxygen and pH were measured in the 0, 0.5, 50, and 5000 mg/L nominal concentrations. No information regarding hardness, alkalinity, pH, TOC, TSS, or salinity of the dilution water chemistry was reported.
Remark	:	Reliability: Medium because a suboptimal study design (nominal test concentrations) was used.
Result	:	The LC50 was 0.71 mg/L (95% confidence limit, 0.5-1.0 mg/L). Mortalities of 0, 0, 100, 100, 100, and 100% were observed at 0, 0.5, 1.0, 50, 500, and 5000 mg/L, respectively. Based on visual observations, the test substance was soluble in well water at all but the highest test concentration. At 5000 mg/L, a precipitate was seen after 24 hours. Temperature ranged from 20.7-22.2°C in the 0 mg/L group. The dissolved oxygen at 0 and 96 hours or at total mortality were 8.8, 8.9, 8.7, and 8.8 mg/L and 7.2, 5.8, 8.7, and 8.8, for the 0, 0.5, 1.0, 50, 500, and 5000 mg/L groups, respectively. The pH values at 0 and 96 hours or at total mortality were 6.8, 6.8, 8.6, and 9.5 and 6.9, 6.9, 8.6, and 9.5 for the 0, 0.5, 1.0, 50, 500, and 5000 mg/L groups, respectively.
Test substance	:	2-Amino-2-methylbutanenitrile, purity 78%

24.05.2006 (8)

Type	:	
Species	:	other: Fish
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC50	:	744.5
Method	:	other: ECOSAR v.0.993
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	744.5 mg/L; log Kow = -0.25

15.05.2006 (23)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type	:	

Species	:	Daphnia sp. (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
EC50	:	41.1
Method	:	other: ECOSAR v0.993
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	41.1 mg/L; log Kow = -0.25

15.05.2006 (23)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species	:	other algae: green
Endpoint	:	
Exposure period	:	96 hour(s)
Unit	:	
EC50	:	= 35.7 calculated
Method	:	other: Modeled
Year	:	
GLP	:	
Test substance	:	as prescribed by 1.1 - 1.4
Result	:	35.7 mg/L; log Kow = -0.25

15.05.2006 (23)

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SEDIMENT DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.4 TOX. TO OTHER NON MAMM. TERR. SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.0 TOXICOKINETICS, METABOLISM AND DISTRIBUTION

5.1.1 ACUTE ORAL TOXICITY

Type	:	LD50
Value	:	74 mg/kg bw
Species	:	rat
Strain	:	other: ChR-CD
Sex	:	male
Number of animals	:	
Vehicle	:	other: corn oil
Doses	:	70, 75, 80, and 90 mg/kg
Method	:	other: The method used is not specified
Year	:	1980
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study. The test substance, as a suspension in corn oil, was administered by gavage in single doses to 4 groups of 10 young adult rats. Dose levels were 70, 75, 80, and 90 mg/kg. The surviving rats were weighed and observed during a 14-day recovery period, and then sacrificed. The LD50 value was calculated from the mortality data using the method of D. J. Finney.
Remark	:	Reliability: High because a scientifically defensible or guideline method was used.
Result	:	Mortality was 1/10, 7/10, 9/10, and 10/10 at 70, 75, 80, and 90 mg/kg, respectively. All deaths occurred within 1 day after dosing. At 70 mg/kg only slight initial weight loss was observed. At 75 mg/kg, lethargy, gasping, moribundity, and prostration were observed on the day of dosing. Slight weight loss was observed in 2 of the 3 survivors on the day after dosing. At 80 mg/kg, salivation, tremors, lethargy, moribundity, prostration, and weakness were observed on the day of dosing. Slight weight loss was observed in the 1 survivor on the day after dosing. At 90 mg/kg, tremors, convulsions, gasping, lethargy, and moribundity were observed on the day of dosing. LC50 = 74 mg/kg (95% confidence limites, 71-76 mg/kg)
Test substance	:	2-Amino-2-methylbutanenitrile, purity 80%

15.05.2006 (3)

5.1.2 ACUTE INHALATION TOXICITY

Type	:	LC50
Value	:	107 ppm
Species	:	rat
Strain	:	other: Crl:CD®BR
Sex	:	male/female
Number of animals	:	
Vehicle	:	
Doses	:	102, 106, 120, 126, and 225 ppm
Exposure time	:	1 hour(s)
Method	:	other
Year	:	1987
GLP	:	yes

Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study. Groups of 5 male and 5 female rats were exposed for 1 hour to the test substance in air at mean vapor concentrations of 102, 106, 120, 126, and 225 ppm. Rats were exposed nose-only. Rats were weighed prior to exposure, and were observed for clinical signs of toxicity during exposure. Surviving rats were weighed and observed daily for 14 days. No pathological evaluations were performed. Two analytical methods were used to measure the atmospheric concentration of the test substance. A gas chromatographic analysis was used to measure the atmospheric concentration of aminonitrile vapor (active ingredient). A colorimetric method was used to estimate the atmospheric concentration of ammonia. Chamber temperature, relative humidity, and chamber oxygen content were recorded.
Remark	:	Reliability: High because a scientifically defensible or guideline method was used.
Result	:	107 ppm (estimated for male and female rats combined) Chamber temperature ranged from 28-34°C, relative humidity ranged from 9-19%, and chamber oxygen content was 21%. Mortality in male rats was 0/5, 3/5, 5/5, 3/5, and 5/5 at 102, 106, 120, 126, and 225 ppm, respectively. Mortality in female rats was 0/5, 5/5, 5/5, 5/5, and 5/5 at 102, 106, 120, 126, and 225 ppm, respectively. The majority of the deaths occurred during exposure, with remaining deaths occurring within 1 day of exposure. During exposure, rats in all groups had a red nasal discharge and a diminished response to sound. Rats that survived the exposure were lethargic or prostrate when released from the restrainers. Rats that survived the recovery period had no significant weight loss or adverse clinical signs. The LC50 for male rats was 111 ppm. The LC50's for female rats and for both sexes combined could not be calculated due to the steep dose-response observed. However, these LC50's were estimated to be 104 and 107 ppm, respectively. Estimated ammonia concentrations were well below those expected to cause death.
Test substance 15.05.2006	:	2-Amino-2-methylbutanenitrile, purity 74.9% (7)

5.1.3 ACUTE DERMAL TOXICITY

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species	:	rabbit
Concentration	:	.5 other: mL
Exposure	:	
Exposure time	:	24 hour(s)
Number of animals	:	
Vehicle	:	
PDII	:	
Result	:	
Classification	:	

Method	:	other
Year	:	1980
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study. Six rabbits were clipped free of hair on the trunk and lateral area, and placed in FDA-type stocks. Doses of 0.5 mL of the test substance were applied to intact skin under gauze squares. Rubber sheeting was then loosely wrapped around the trunk and secured with adhesive tape. After 24 hours, the rabbits were removed from the stocks, the patches taken off, and the reactions observed. Observations were also made at 48 hours.
Remark	:	Reliability: High because a scientifically defensible or guideline method was used.
Result	:	At the 24-hour observation, slight erythema in 3/6 rabbits and no erythema in 3/6 rabbits was observed. At the 48-hour observation, slight erythema in 2/6 rabbits and no erythema in 4/6 rabbits was observed. No edema was observed throughout the study.
Test substance	:	2-Amino-2-methylbutanenitrile, purity 80%

15.05.2006 (5)

Remark	:	Data from this additional source support the study results summarized above. This study was not chosen for detailed summarization because the data were not substantially additive to the database.

15.05.2006 (4)

5.2.2 EYE IRRITATION

Species	:	rabbit
Concentration	:	
Dose	:	
Exposure time	:	
Comment	:	
Number of animals	:	
Vehicle	:	
Result	:	
Classification	:	
Method	:	other
Year	:	1980
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	One-tenth mL of undiluted test substance was placed into the right conjunctival sac of each of 2 male albino rabbits. After 20 seconds, 1 treated eye was washed with tap water for 1 minute. The treated eye of the other rabbit was not washed. Observations of the cornea, iris, and conjunctiva were made with a hand slit lamp at 1 and 4 hours, and at 1, 2, 3, 14, 21, 27, and 34 days. Fluor-i-strip® stain and a biomicroscope were used at examinations after the day of treatment.
Remark	:	Reliability:High because a scientifically defensible or guideline method was used.
Result	:	The test substance produced generalized moderate to severe corneal cloudiness with the development of pannus, moderate iritis, and severe conjunctivitis. Severe generalized cloudiness and moderate iritis persisted. The conjunctiva was normal at 27 days. An eye dosed with the test substance and promptly washed had a small area of transient slight corneal cloudiness and mild conjunctivitis with no iritic effects. The washed

eye was normal at 2 days.

Test substance : 2-Amino-2-methylbutanenitrile, purity 80%
15.05.2006 (6)

5.3 SENSITIZATION

Type	:	
Species	:	guinea pig
Number of animals	:	
Vehicle	:	
Result	:	
Classification	:	
Method	:	other: Modified Buehlor method
Year	:	1980
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Method : No specific test guideline was reported; however, the design is a modification of the Buehler method.

The primary irritation test was conducted on 10 unexposed guinea pigs with 0.05 mL of a 100% (as received) solution and 10% solution of the test substance in dimethyl phthalate (DMP) on shaved intact shoulder skin. The induction phase for sensitization was a series of 4 sacral intradermal injections of 0.1 mL of a 1.0% solution in DMP, 1 each week beginning 2 days after the test for primary irritation. After a 13-day rest period, the test guinea pigs were challenged for sensitization with 0.05 mL of a 100% (as received) solution and a 10% solution of test substance in DMP on shaved, intact shoulder skin. At the same time 10 unexposed guinea pigs (controls) of the same age received identical topical applications.

Remark : Reliability: High because a scientifically defensible or guideline method was used.

Result : The test substance produced neither sensitization nor irritation in 10 male guinea pigs.

Test substance : 2-Amino-2-methylbutanenitrile, purity 80%
15.05.2006 (4)

5.4 REPEATED DOSE TOXICITY

5.5 GENETIC TOXICITY 'IN VITRO'

5.6 GENETIC TOXICITY 'IN VIVO'

5.7 CARCINOGENICITY

5.8.1 TOXICITY TO FERTILITY

5.8.2 DEVELOPMENTAL TOXICITY/TERATOGENICITY

5.8.3 TOXICITY TO REPRODUCTION, OTHER STUDIES

5.9 SPECIFIC INVESTIGATIONS

5.10 EXPOSURE EXPERIENCE

5.11 ADDITIONAL REMARKS

6.1 ANALYTICAL METHODS

6.2 DETECTION AND IDENTIFICATION

7.1 FUNCTION

7.2 EFFECTS ON ORGANISMS TO BE CONTROLLED

7.3 ORGANISMS TO BE PROTECTED

7.4 USER

7.5 RESISTANCE

8.1 METHODS HANDLING AND STORING

8.2 FIRE GUIDANCE

8.3 EMERGENCY MEASURES

8.4 POSSIB. OF RENDERING SUBST. HARMLESS

8.5 WASTE MANAGEMENT

8.6 SIDE-EFFECTS DETECTION

8.7 SUBSTANCE REGISTERED AS DANGEROUS FOR GROUND WATER

8.8 REACTIVITY TOWARDS CONTAINER MATERIAL

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10.1 END POINT SUMMARY

10.2 HAZARD SUMMARY

10.3 RISK ASSESSMENT

I U C L I D

Data Set

Existing Chemical	:	ID: 19355-69-2
CAS No.	:	19355-69-2
Substance name	:	Propanenitrile, 2-amino-2-methyl-
EC No.	:	242-989-3
Molecular Formula	:	C4H8N2
Producer related part		
Company	:	E. I. du Pont de Nemours and Company
Creation date	:	07.02.2006
Substance related part		
Company	:	E. I. du Pont de Nemours and Company
Creation date	:	07.02.2006
Status	:	
Memo	:	
Printing date	:	02.06.2006
Revision date	:	
Date of last update	:	24.05.2006
Number of pages	:	27
Chapter (profile)	:	Chapter: 1, 2, 3, 4, 5, 6, 7, 8, 10
Reliability (profile)	:	Reliability: without reliability, 1, 2, 3, 4
Flags (profile)	:	Flags: without flag, confidential, non confidential, WGK (DE), TA-Luft (DE), Material Safety Dataset, Risk Assessment, Directive 67/548/EEC, SIDS

1.0.1 APPLICANT AND COMPANY INFORMATION

1.0.2 LOCATION OF PRODUCTION SITE, IMPORTER OR FORMULATOR

1.0.3 IDENTITY OF RECIPIENTS

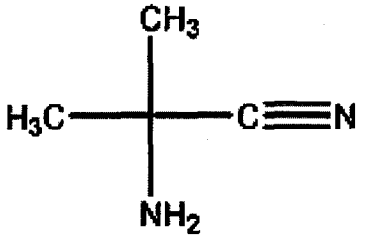
1.0.4 DETAILS ON CATEGORY/TEMPLATE

1.1.0 SUBSTANCE IDENTIFICATION

1.1.1 GENERAL SUBSTANCE INFORMATION

Purity type	:	
Substance type	:	
Physical status	:	liquid
Purity	:	
Colour	:	brown
Odour	:	ammonia-like

Attached document : 19355-2.bmp



02.05.2006

1.1.2 SPECTRA

1.2 SYNONYMS AND TRADENAMES

1-Cyano-1-methylethylamine

07.02.2006

2-Amino-2-cyanopropane

07.02.2006

2-Amino-2-methylpropanenitrile

07.02.2006

2-Amino-2-methylpropionitrile

07.02.2006

2-Aminoisobutyronitrile

07.02.2006

2-Aminopropane-2-carbonitrile

15.05.2006

2-Cyanoisopropylamine

07.02.2006

ABN

07.02.2006

ACAN

07.02.2006

alpha-Amino-alpha-methylpropionitrile

07.02.2006

alpha-Aminoisobutyronitrile

07.02.2006

Aminodimnethylacetonitrile

07.02.2006

Vazo 64AN

07.02.2006

1.3 IMPURITIES

1.4 ADDITIVES

1.5 TOTAL QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.6.3 PACKAGING

1.7 USE PATTERN

1.7.1 DETAILED USE PATTERN

1.7.2 METHODS OF MANUFACTURE

1.8 REGULATORY MEASURES

15.05.2006

1.8.1 OCCUPATIONAL EXPOSURE LIMIT VALUES

Type of limit : other: Skin, DuPont Acceptable Expsoure Limit (AEL)
Limit value :
Short term exposure limit value
Limit value : .0005 %
Time schedule : 15 minute(s)
Frequency : times

Result : 5 ppm (15-minute TWA)
15.05.2006

1.8.2 ACCEPTABLE RESIDUES LEVELS

1.8.3 WATER POLLUTION

1.8.4 MAJOR ACCIDENT HAZARDS

1.8.5 AIR POLLUTION

1.8.6 LISTINGS E.G. CHEMICAL INVENTORIES

1.9.1 DEGRADATION/TRANSFORMATION PRODUCTS

1.9.2 COMPONENTS

1.10 SOURCE OF EXPOSURE

1.11 ADDITIONAL REMARKS

Remark : Existing published and unpublished data were collected and scientifically evaluated to determine the best possible study or studies to be summarized for each required endpoint. In the spirit of this voluntary program, other data of equal or lesser quality are not summarized, but are listed as additional references at the end of each appropriate section, with a statement to reflect the reason why these studies were not summarized.

07.02.2006

1.12 LAST LITERATURE SEARCH

1.13 REVIEWS

2.1 MELTING POINT

Value	:	-4.7 °C
Sublimation	:	
Method	:	other: Modeled
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. MPBPWIN, v.1.41, module of EPIWIN 3.11 (Syracuse Research Corporation). MPBPWIN estimates melting point by 2 different methods. The first is an adaptation of the Joback group contribution method for melting point (Joback, 1982; Reid et al., 1987) and the second is a simple Gold and Ogle method suggested by Lyman,1985.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	Value at 760 mmHg
07.02.2006		(19) (21) (31)
Remark	:	Additional Reference for Melting Point
07.02.2006		(12)

2.2 BOILING POINT

Decomposition	:	yes
Method	:	
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Not assignable because limited study information was available.
08.02.2006		(13)
Remark	:	Additional Reference for Boiling Point:
08.02.2006		(6)

2.3 DENSITY

Type	:	relative density
Value	:	.9 at 25 °C
Method	:	
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Not assignable because limited study information was available.
08.02.2006		(12)
Remark	:	Additional Reference for Density:
08.02.2006		(6)

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value	:	2.84 at 25 °C
Decomposition	:	
Method	:	other (calculated): MPBPWIN v1.40
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Estimated as the mean of Antoine & Grain methods Syracuse Research Corporation (MPBPWIN) program in EPIWIN v3.11 estimates the vapor pressure using the modified Grain method. A description of the methodology is detailed in Lyman, 1985.
Remark	:	Reliability: Estimated value based on accepted model.
15.05.2006		(14) (21)

Value	:	39.99 hPa at 66 °C
Decomposition	:	
Method	:	
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Not assignable because limited study information was available.
Result	:	30 mmHg at 66 degree C (Converted to 39.99 hPa)
08.02.2006		(12)

Remark	:	Additional Reference for Vapor Pressure:
08.02.2006		(6)

2.5 PARTITION COEFFICIENT

Partition coefficient	:	octanol-water
Log pow	:	-3.23 at 25 °C
pH value	:	
Method	:	other (calculated): KOWWIN, v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. KOWWIN, v. 1.67, module of EPIWIN 3.11 (Syracuse Research Corporation). KOWWIN uses "fragment constant" methodologies to predict log P. In a "fragment constant" method, a structure is divided into fragments (atom or larger functional groups) and coefficient values of each fragment or group are summed together to yield the log P estimate.
Remark	:	Reliability: Estimated value based on accepted model.
Test substance	:	(SMILES: C(#N)C(N(H)(H)(H)(CL))(C)C) as ionized salt at acidic environmental pH and high dilution
08.02.2006		(14) (28)

Partition coefficient	:	octanol-water
Log pow	:	-.04 at 25 °C
pH value	:	

Method	:	other (calculated): KOWWIN, v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. KOWWIN, v. 1.67, module of EPIWIN 3.11 (Syracuse Research Corporation). KOWWIN uses "fragment constant" methodologies to predict log P. In a "fragment constant" method, a structure is divided into fragments (atom or larger functional groups) and coefficient values of each fragment or group are summed together to yield the log P estimate.
Remark	:	Reliability: Estimated value based on accepted model.
Test substance	:	SMILES: C(#N)C(N)(C)C

08.02.2006 (14) (28)

2.6.1 SOLUBILITY IN DIFFERENT MEDIA

Solubility in	:	Water
Value	:	> 100 g/l at °C
pH value	:	
concentration	:	at °C
Temperature effects	:	
Examine different pol.	:	
pKa	:	4.9 at 25 °C
Description	:	
Stable	:	
Deg. product	:	
Method	:	other: Modeled
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	pKa - SPARC On-line calculator, University of Georgia Solubility - WSKOWWIN v.1.41, module of EPIWIN 3.11 (Syracuse Research Corporation). Water solubility is estimated from log Kow using molecular weight and molecular fragment correction factors.
Remark	:	Reliability: Estimated value based on accepted model.

15.05.2006 (17) (25)

Deg. product	:	
Method	:	
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Additional References for Water Solubility:

15.02.2006 (6) (12)

2.6.2 SURFACE TENSION

2.7 FLASH POINT

Value	:	1.7 °C
Type	:	
Method	:	other: SFCC
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4

Remark : Reliability: Not assignable because limited study information was available.
15.05.2006 (12)

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

Result : flammable
Method :
Year :
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Remark : Reliability: Not assignable because limited study information was available.
15.05.2006 (12)

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 DISSOCIATION CONSTANT

2.13 VISCOSITY

2.14 ADDITIONAL REMARKS

3.1.1 PHOTODEGRADATION

Deg. product	:	
Method	:	other (calculated): AOPWIN v1.91
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Estimate based on known qualitative structure-activity relationships.
Result	:	Direct Photolysis: No Data Indirect Photolysis: Estimated half-life = 48 days, due to OH radical oxidation in the atmosphere. With an estimated vapor pressure of 2.84 mm Hg (25 degree C) 2-amino-2-methylpropanenitrile will exist as a vapor in the atmosphere. Breakdown Products: No Data

15.05.2006 (14) (27)

3.1.2 STABILITY IN WATER

Deg. product	:	
Method	:	other (calculated): HYDROWIN v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. HYDROWIN, v. 1.67 module of EPIWIN v3.11 (Syracuse Research Corporation). HYDROWIN cannot estimate a hydrolysis rate constant for this type of chemical structure.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	% Hydrolyzed: No Data Half Life: In the presence of water and the absence of excess ammonia, aminonitriles may disproportionate into their constituents: ketone, cyanide, and ammonium (Kirk-Othmer, 1978)

15.05.2006 (14) (20) (30)

3.1.3 STABILITY IN SOIL

3.2.1 MONITORING DATA

3.2.2 FIELD STUDIES

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

Type	:	fugacity model level III
Media	:	other: Air, Water, Soil, and Sediments
Air	:	% (Fugacity Model Level I)
Water	:	% (Fugacity Model Level I)
Soil	:	% (Fugacity Model Level I)

Biota : % (Fugacity Model Level II/III)
Soil : % (Fugacity Model Level II/III)
Method : other: Mackay, Level III Fugacity Model
Year :

Method : Modeled.

SMILES: C(#N)C(N)(C)C
Molecular Wt: 84.12
Vapor Pressure: 2.84 mm Hg (MPBPWIN program)
Log Kow: -0.04 (KOWWIN program)

Henry's Law Constant - HENRYWIN v. 3.10 module of EPIWIN v3.11 (Syracuse Research Corporation). Henry's Law Constant (HLC) is estimated by two separate methods that yield two separate estimates. The first method is the bond contribution method and the second is the group contribution method. The bond contribution method is able to estimate many more types of structures; however, the group method estimate is usually preferred (but not always) when all fragment values are available.

Koc - Calculated from Kow by the Mackay Level III fugacity model incorporated into EPIWIN v3.11 (Syracuse Research Corporation).

Environmental Distribution - Mackay Level III fugacity model, in EPIWIN v3.11 (Syracuse Research Corporation). Emissions (1000 kg/hr) to air, water, and soil compartments

Fugacity - The methodology and programming for the Level III fugacity model incorporated into EPIWIN v3.11 (Syracuse Research Corporation) were developed by Dr. Donald MacKay and coworkers and are detailed in Mackay, 1991; Mackay et al. 1996a; Mackay et al. 1996b.

Remark : Reliability: Estimated value based on accepted model.
Result :

Compartment	% of total distribution	½ life (hours) (advection + reaction)
Air	1	1150
Water	45.9	900
Soil	53.9	1800
Sediment	0.089	8100

Absorption Coefficient: Koc = 0.374 (calc by model)

Volatility: Henry's Law Constant = 5.54x10E-9 atm-m3/mole (HENRYWIN program)

09.02.2006 (18) (22) (23) (24) (26)

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

Deg. product :
Method : other: Calculated BIOWIN v4.01
Year :
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Method	:	Modeled. BIOWIN, v. 4.01 module of EPINWIN v3.11 (Syracuse Research Corporation). BIOWIN estimates the probability for the rapid aerobic biodegradation of an organic chemical in the presence of mixed populations of environmental microorganisms. Estimates are based upon fragment constants that were developed using multiple linear and non-linear regression analyses.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	Linear Model Prediction: 0.9844 (Biodegrades Fast) Non-Linear Model Prediction: 0.9971 (Biodegrades Fast) Ultimate Biodegradation Timeframe: 2.7432 (weeks to months) Primary Biodegradation Timeframe: 3.5510 (days to weeks) MITI Linear Model Prediction: 0.6353 (readily degradable) MITI Non-Linear Model Prediction: 0.6188 (readily degradable) Breakdown Products: No Data

15.05.2006 (2) (14) (15) (16) (32)

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

Elimination	:	
Method	:	other: Modeled BCFWIN 2.15
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	BCFWIN v. 2.15 module of EPINWIN v3.11 (Syracuse Research Corporation). BCFWIN estimates the bioconcentration factor (BCF) of an organic compound using the compound's log octanol-water partition coefficient (Kow) with correction factors based on molecular fragments EPINWIN v3.11
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	log BCF = 0.5 (unionized or salt)

16.05.2006 (1)

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	
Species	:	Pimephales promelas (Fish, fresh water)
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC50	:	.71
Method	:	other
Year	:	1992
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study. The test substance was tested in an unaerated, static acute test. Nominal concentrations of the test substance were 0, 0.5, 1.0, 50, 500, and 5000 mg/L. Fish were <1 g at study start, and fish loading was <5 g per 4 L test solution. One test chamber per concentration with 5 animals per test chamber were used. The photoperiod was 16 hours light:8 hours dark. Dissolved oxygen and pH were measured in the 0, 0.5, 50, and 5000 mg/L nominal concentrations. No information regarding hardness, alkalinity, TOC, or TSS of the dilution water chemistry was reported.
Remark	:	Reliability: Medium because a suboptimal study design (nominal test concentrations) was used.
Result	:	The LC50 was 0.71 mg/L (95% confidence limit, 0.5-1.0 mg/L). Mortality was 0, 0, 100, 100, 100, 100% at 0, 0.5, 1.0, 50, 500, and 5000 mg/L, respectively. Based on visual observations, the test substance was soluble in well water at all but the 5000 mg/L test concentration, which had a slightly cloudy appearance. Temperature ranged from 20.7-21.2°C in the 0 mg/L group. Dissovled oxygen concentration at 0 hours was 8.6, 8.7, 8.6, and 9.4 mg/L at 0, 0.5, 50, and 5000 mg/L, respectively. Dissovled oxygen concentration at 96 hours or total mortality was 7.0, 7.7, 8.6, and 9.4 mg/L at 0, 0.5, 50, and 5000 mg/L, respectively. The pH values at 0 hours were 7.0, 7.1, 8.7, and 9.4 at 0, 0.5, 50, and 5000 mg/L, respectivley. The pH values at 96 hours or total mortality were 7.3, 7.5, 8.7, and 9.4 at 0, 0.5, 50, and 5000 mg/L, respectively.
Test substance	:	2-Amino-2-methylpropanenitrile, purity 74%

24.05.2006 (8)

Type	:	
Species	:	other: Fish
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC50	:	468.3
Method	:	other: ECOSAR
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	468.3 mg/L; log Kow = -0.04

15.02.2006 (29)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type	:	
Species	:	Daphnia magna (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
EC50	:	7.1
Method	:	
Year	:	1998
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study. Nominal concentrations used were 0, 0.5, 1.0, 50, 500, and 5000 mg/L. The test chamber was covered with clean glass plates. Two test chambers per concentration were used, with 5 daphnid neonates per test chamber. Dissolved oxygen and pH were recorded at 0 and 48 hours, or at total immobility. Water chemistry parameters at study start included alkalinity of 79 mg/L as CaCO3, hardness of 79 mg/L as CaCO3, and conductivity of 190 umhos/cm. Photoperiod was 16 hours light:8 hours dark. No information regarding TOC or TSS of the dilution water chemistry was reported.
Remark	:	Reliability: Medium because a suboptimal study design (nominal test concentrations) was used.
Result	:	The LC50 was 7.1 mg/L (95% confidence limit, 1-50 mg/L). Based on visual observations, the water control solution and the 0.5, 1.0, and 50 mg/L test solutions were clear with no color throughout the study. The 500 and 5000 mg/L test solutions were slightly cloudy at test start. Immobilities were 0, 0, 0, 100, 100, and 100% in the 0, 0.5, 1.0, 50, 500, and 5000 mg/L test concentrations, respectively. Total immobility at 500 and 5000 mg/L was observed within 2 minutes of test start. Water quality parameters were within acceptable limits, except the pH values in the 50, 500, and 5000 mg/L test solutions at the test start, which were slightly above the maximum limit of 9.0 (range 9.1-9.6), and the dissolved oxygen values in some of the test chambers exceeded the maximum limit of 105% saturation at test temperatures (i.e., approximately 9.7 mg/L at 20°C). pH at test start was 7.6, 7.8, 7.8, 9.1, 9.3, and 9.6 at 0, 0.5, 1, 50, 500, and 5000 mg/L, respectively. pH at 48 hours was 7.8-7.9, 8.0, and 8.0 at 0, 0.5, and 1 mg/L, respectively. Dissolved oxygen at test start was 9.5-9.6, 10.0-10.1, 10.1, 10.2-10.3, 9.7-10.4, and 9.4-9.5 at 0, 0.5, 1, 50, 500, and 5000 mg/L, respectively. Dissolved oxygen at 48 hours or total mortality was 8.9-9.0, 8.6-8.7, 8.5-8.8, and 9.9-10.0 at 0, 0.5, 1, and 50 mg/L, respectively. Temperature at study start was 20.2, 19.9-20.0, 19.9, 19.9, 19.9, and 19.8-19.9°C at 0, 0.5, 1, 50, 500, and 5000 mg/L, respectively. Temperature at 48 hours was 19.5, 19.4-19.5, and 19.4°C at 0, 0.5, and 1 mg/L, respectively.
Test substance	:	2-Amino-2-methylpropanenitrile, purity 73-75%

22.05.2006 (9)

Type	:	
Species	:	Daphnia sp. (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
EC50	:	26.6
Method	:	other: Modeled by ECOSAR v.0.993
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4

Remark	:	Reliability: Estimated value based on accepted model.
Result	:	26.6 mg/L; log Kow = -0.04
15.05.2006		(29)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species	:	other algae
Endpoint	:	
Exposure period	:	96 hour(s)
Unit	:	mg/l
EC50	:	24.8
Method	:	other: Modeled by ECOSAR v.0.993
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Remark	:	Reliability: Estimated value based on accepted model.
Result	:	24.8 mg/L; log Kow = -0.04
17.02.2006		(29)

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SEDIMENT DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.4 TOX. TO OTHER NON MAMM. TERR. SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.0 TOXICOKINETICS, METABOLISM AND DISTRIBUTION

5.1.1 ACUTE ORAL TOXICITY

Type	:	LD50
Value	:	10 - 30 mg/kg bw
Species	:	rat
Strain	:	other:Charles River Albino
Sex	:	female
Number of animals	:	
Vehicle	:	
Doses	:	3, 10, 30, 100, 300, 1000, 3000, and 10,000 mg/kg.
Method	:	other
Year	:	1974
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported. An acute oral toxicity study was conducted on female rats (1/dose level), administered undiluted at 0.1 and 1.0% (w/v) aqueous solutions of 3, 10, 30, 100, 300, 1000, 3000, and 10,000 mg/kg. Body weights and clinical signs were periodically recorded. Surviving rats were sacrificed after 14 days. Gross necropsy was performed on all rats.
Remark	:	Reliability: High because a scientifically defensible or guideline method was used.
Result	:	Rats dosed with 3 or 10 mg/kg survived. Mortality occurred in rats dosed with 30 mg/kg or higher. Death occurred in 1 minute to 1 ¼ hours. The surviving animals at 3 and 10 mg/kg both gained weight over the 14-day observation period. Reactions exhibited by the rats (dose levels 30-10,000 mg/kg) within seconds after oral intubation included hypoactivity, labored breathing, salivation, straub tail, rhinitis, muscular weakness, tremors, fibrillary action, and convulsions. No reactions were noted in animals dosed at the 3 and 10 mg/kg dose levels. Necropsy examination of the animals that died revealed hemorrhages in the gastrointestinal tracts and dark red lungs. Gastroenteritis was noted at sacrifice in the rat dosed with 3 mg/kg. No other gross pathologic alterations were noted in rats sacrificed at the end of the 14-day observation period.
Test substance	:	2-Amino-2-methylpropanenitrile, purity not reported

15.05.2006 (4)

5.1.2 ACUTE INHALATION TOXICITY

Type	:	other: ALC
Value	:	71 ppm
Species	:	rat
Strain	:	other: Crl:CDR(SD)BR
Sex	:	male
Number of animals	:	
Vehicle	:	
Doses	:	22, 32, 46, 65, 71, 74
Exposure time	:	4 hour(s)
Method	:	other
Year	:	1998
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Method : No specific test guideline was reported.

Groups of 6 male rats each were exposed for 4 hours, whole body to vapor atmospheres of 22, 32, 46, 65, 71, or 74 ppm. Another group of 6 male rats was exposed whole body for a single 2-hour period to 74 ppm. Rats were approximately 6 -10 weeks old and weighed between 198-365 g at the time of exposure.

Rats were observed for mortality and response to alerting stimuli during the exposure and observed for mortality and clinical signs of toxicity after exposure. During a 14-day post exposure period, all surviving rats were observed each day for mortality, and were weighed and observed for clinical signs of toxicity at regular intervals. Surviving rats were sacrificed without pathological examination.

Chamber atmospheres were generated by flash evaporation of the test substance in air.

During exposure, rats were placed within wire-mesh cages and exposed whole-body inside the exposure chamber.

The atmospheric concentration of the test substance was determined by gas chromatography at approximately 30-minute intervals during each exposure. Chamber airflow was set at the beginning of each exposure to achieve at least 12 air changes per hour. Chamber temperature was targeted at 22±2°C. Chamber relative humidity was targeted at 50±10%. Airflow, temperature, and relative humidity were monitored continually.

Remark : Reliability: High because a scientifically defensible or guideline method was used.

Result : Mortality was 0/6, 0/6, 0/12, 0/6, 6/6, and 5/6 at 22, 32, 46, 65, 71, and 74 ppm, respectively. In general, rats died within 1 day of exposure. Clinical signs of toxicity observed included labored breathing, lethargy, gasping, nasal discharge, and stained fur. No clinical signs of toxicity were observed at < 65 ppm. In general, clinical signs of toxicity were observed for 1-2 days after exposure and had resolved by test day 3.

Weight losses of 4-8% were observed in some groups within 1 day of exposure. Rats generally resumed normal weight gains for the remainder of the recovery period.

Test substance : 2-Amino-2-methylpropanenitrile, purity 73-75%

15.05.2006 (11)

Remark : Data from these additional sources support the study results summarized above. These studies were not chosen for detailed summarization because the data were not substantially additive to the database.

15.05.2006 (6) (7)

5.1.3 ACUTE DERMAL TOXICITY

Type : other: ALD
Value : 30 - 100 mg/kg bw
Species : rabbit
Strain : New Zealand white
Sex : male
Number of animals :
Vehicle :
Doses : 30, 100, 300, 1000, 3000 mg/kg
Method : other: The method used is not specified

Year	:	1974
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study. The test substance was administered undiluted on the abraded skin of rabbits (1/dose level) at doses of 30, 100, 300, 1000, and 3000 mg/kg. Body weights were recorded on days 0, 7, and 14. Gross pathology was performed on all rabbits.
Remark	:	Reliability: High because a scientifically defensible or guideline method was used.
Result	:	Mortality was 0, 100, 100, 100, and 100% at 30, 100, 300, 1000, and 3000 mg/kg, respectively. Death occurred in 10 to 35 minutes. The surviving rabbit given 30 mg/kg gained weight throughout the 14-day observation period. Clinical signs observed at 30 mg/kg or greater included excitation, hypoactivity, dyspnea, ataxia, muscular weakness, mydriasis, and miosis, which lasted from 6 to 22 hours. Clinical signs observed at ?100 mg/kg included excitation, rapid respiration, hypoactivity, mydriasis, dyspnea, ataxia, muscular weakness, and tonic convulsions.
Test substance	:	2-Amino-2-methylpropanenitrile, purity 76.3%

15.05.2006 (3)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species	:	rabbit
Concentration	:	30 other: mg/kg
Exposure	:	
Exposure time	:	
Number of animals	:	
Vehicle	:	
PDII	:	
Result	:	
Classification	:	
Method	:	other
Year	:	1974
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	No specific test guideline was reported. The test substance was administered undiluted on the abraded skin of 1 male New Zealand White rabbit at a dose of 30 mg/kg (equivalent to 0.07 g of test substance) for a dermal toxicity study.
Remark	:	Reliability: Low because an inappropriate method was used. The volume of test substance was insufficient to accurately assess dermal irritation.
Result	:	The test substance was slightly to mildly irritating to the skin. Skin changes at 24 hours were characterized by barely perceptible to pale red erythema. At 7 and 14 days, barely perceptible to pale red erythema and slight desquamation were observed at the site of contact.
Test substance	:	2-Amino-2-methylpropanenitrile, purity 76.3%

15.05.2006 (3)

5.2.2 EYE IRRITATION

Species	:	rabbit
Concentration	:	.1 other: mL
Dose	:	
Exposure time	:	
Comment	:	
Number of animals	:	
Vehicle	:	
Result	:	
Classification	:	
Method	:	other:No specific test guideline was reported
Year	:	1974
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4

Method : No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study.

The test substance (0.1 mL) was instilled undiluted into the eyes of 3 rabbits. In addition, 1 rabbit was exposed to 0.01 mL of undiluted test substance, and the eye remained unwashed.

Remark : Reliability: High because a scientifically defensible or guideline method was used.

Result : Three rabbits dosed with 0.1 mL of the test substance exhibited immediate salivation and convulsions, and died within 5 minutes after instillation of the test substance. The rabbit dosed with 0.01 mL exhibited salivation, muscular weakness, hypoactivity, and diarrhea following instillation of the test substance, and was found dead by 72 hours after instillation. Corneal, iritic, and conjunctival scores were 20, 5, and 12, respectively at 1 and 24 hours following instillation.

Test substance : 2-amino-2-methylpropanenitrile, purity not reported.

15.05.2006 (5)

5.3 SENSITIZATION

5.4 REPEATED DOSE TOXICITY

Type	:	
Species	:	rat
Sex	:	male
Strain	:	other: Crl:CDR(SD)BR
Route of admin.	:	inhalation
Exposure period	:	2 weeks
Frequency of treatm.	:	6 hours/day, 5 days/week
Post exposure period	:	
Doses	:	0, 1.4, 7.3, 22 ppm
Control group	:	yes
NOAEL	:	= .0022 %
Method	:	other: The method used is not specified
Year	:	1998
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : No specific test guideline was reported; however, a scientifically defensible approach was used to conduct the study.

Four groups of male rats , 10 per exposure level, were exposed whole-body to mean vapor concentrations of 0, 1.4, 7.3, or 22 ppm of the test substance 6 hours per day for a total of 9 exposures.

The atmospheric concentration of the test substance was determined by gas chromatography at approximately 30-minute intervals during exposure. The exposure chambers were also sampled for ammonia and hydrogen cyanide. These compounds are breakdown products of the test substance. Airflow, temperature, and relative humidity were monitored continually.

During the exposure and a 14-day recovery phase rats were weighed and observed each day for clinical signs of toxicity.

After the last exposure, blood and urine samples were collected for clinical analyses, and 5 rats per group were sacrificed for pathologic examination. At the end of the 14 day recovery period, blood and urine samples were again collected, and all surviving rats were sacrificed for pathologic examination. Fifteen hematologic and 17 clinical chemistry parameters were measured or calculated, and 10 urine parameters were measured or examined.

Five rats per group were necropsied on test day 12. After a 14-day recovery period, the remaining 5 rats from each group were similarly necropsied. During the necropsy, liver, kidneys, lungs, testes, and brain were weighed. All rats were given a complete gross examination and representative samples of approximately 38 tissues were saved for possible histopathological evaluation. All tissues from test day 12 rats in the control and high (0 and 22 ppm, respectively) concentration groups were examined microscopically. Liver, kidneys, lungs, larynx/pharynx, nose, testes, and gross lesions from test day 12 low and intermediate (1.4 and 7.3 ppm, respectively) concentration groups, and 14-day recovery control and 22 ppm concentration groups were examined microscopically.

Descriptive statistics were used to summarize experimental data. Mean body weights and body weight gains were statistically analyzed with a one-way analysis of variance (ANOVA). Pairwise comparisons between test and control groups (sexes separate) were made with the Dunnett's test. For clinical laboratory data, ANOVA and Bartlett's test were calculated for each sampling time. Dunnett's test was used to compare means from the control groups and each of the groups exposed to the test substance. When the results of the Bartlett's test were significant, the Kruskal-Wallis test was employed and the Mann-Whitney U test was used to compare means from the control groups and each of the groups exposed to the test substance. Mean final body weights and mean absolute and relative (to body and brain) organ weights were analyzed by ANOVA. When the value of the F-statistic for differences among groups was significant, pairwise comparisons between treated and control groups were made with Dunnett's test. Bartlett's test was used to test for homogeneity of variances.

Remark : Reliability: Medium because there was no demonstrated effect at the highest concentration tested.

Result : Analytically determined mean vapor concentrations of the test substance for the 3 test chambers were 1.4, 7.3, and 22 ppm. No hydrogen cyanide was found in the 1.4 ppm or 7.3 ppm chambers, but approximately 0.9 ppm was found in the 22 ppm chamber. Low concentrations of ammonia were present in all test chambers (1.5-6 ppm). Concentrations of breakdown products found in the chambers were not considered toxicologically significant.

The mean relative humidity for the chambers was between 37 and 41%, the mean chamber temperatures were 25 or 26°C, and the oxygen concentrations were 21%.

No deaths were observed during the study. No differences in body weight or clinical observations were observed during the study. No toxicologically

important changes occurred in hematology, clinical chemistry, or urine analytical parameters. No test substance-related changes in organ weights, gross observation, or microscopic observations were observed at any exposure level tested.

Under the conditions of this study, the no-observed-effect level (NOEL) was 22 ppm.

Test substance : 2-Amino-2-methylpropanenitrile, purity 73-75%
15.05.2006 (10)

5.5 GENETIC TOXICITY 'IN VITRO'

5.6 GENETIC TOXICITY 'IN VIVO'

5.7 CARCINOGENICITY

5.8.1 TOXICITY TO FERTILITY

5.8.2 DEVELOPMENTAL TOXICITY/TERATOGENICITY

5.8.3 TOXICITY TO REPRODUCTION, OTHER STUDIES

5.9 SPECIFIC INVESTIGATIONS

5.10 EXPOSURE EXPERIENCE

5.11 ADDITIONAL REMARKS

6.1 ANALYTICAL METHODS

6.2 DETECTION AND IDENTIFICATION

7.1 FUNCTION

7.2 EFFECTS ON ORGANISMS TO BE CONTROLLED

7.3 ORGANISMS TO BE PROTECTED

7.4 USER

7.5 RESISTANCE

8.1 METHODS HANDLING AND STORING

8.2 FIRE GUIDANCE

8.3 EMERGENCY MEASURES

8.4 POSSIB. OF RENDERING SUBST. HARMLESS

8.5 WASTE MANAGEMENT

8.6 SIDE-EFFECTS DETECTION

8.7 SUBSTANCE REGISTERED AS DANGEROUS FOR GROUND WATER

8.8 REACTIVITY TOWARDS CONTAINER MATERIAL

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10.1 END POINT SUMMARY

10.2 HAZARD SUMMARY

10.3 RISK ASSESSMENT

IUCLID

Data Set

Existing Chemical	:	ID: 13893-53-3
CAS No.	:	13893-53-3
Substance name	:	2-Amino-2,3-dimethylbutanenitrile

Producer related part

Company	:	E. I. du Pont de Nemours and Company
Creation date	:	09.02.2006

Substance related part

Company	:	E. I. du Pont de Nemours and Company
Creation date	:	09.02.2006
Status	:	
Memo	:	
Printing date	:	02.06.2006
Revision date	:	
Date of last update	:	31.05.2006
Number of pages	:	28
Chapter (profile)	:	Chapter: 1, 2, 3, 4, 5, 6, 7, 8, 10
Reliability (profile)	:	Reliability: without reliability, 1, 2, 3, 4
Flags (profile)	:	Flags: without flag, confidential, non confidential, WGK (DE), TA-Luft (DE), Material Safety Dataset, Risk Assessment, Directive 67/548/EEC, SIDS

1.0.1 APPLICANT AND COMPANY INFORMATION

1.0.2 LOCATION OF PRODUCTION SITE, IMPORTER OR FORMULATOR

1.0.3 IDENTITY OF RECIPIENTS

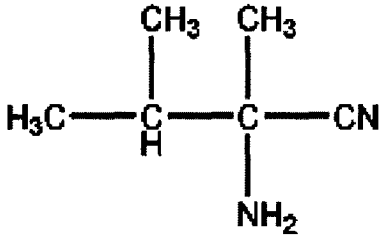
1.0.4 DETAILS ON CATEGORY/TEMPLATE

1.1.0 SUBSTANCE IDENTIFICATION

1.1.1 GENERAL SUBSTANCE INFORMATION

Purity type :
Substance type :
Physical status : liquid
Purity :
Colour :
Odour :

Attached document : untitled.bmp



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1.1.2 SPECTRA

1.2 SYNONYMS AND TRADENAMES

Aminonitrile

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1.3 IMPURITIES

1.4 ADDITIVES

1.5 TOTAL QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.6.3 PACKAGING

1.7 USE PATTERN

1.7.1 DETAILED USE PATTERN

1.7.2 METHODS OF MANUFACTURE

1.8 REGULATORY MEASURES

1.8.1 OCCUPATIONAL EXPOSURE LIMIT VALUES

Type of limit : other: OSHA PEL (TWA)
Limit value : 4.7 other: ppm

Remark : 4.7 ppm (5 mg/m3): PEL/TLV
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1.8.2 ACCEPTABLE RESIDUES LEVELS

1.8.3 WATER POLLUTION

1.8.4 MAJOR ACCIDENT HAZARDS

1.8.5 AIR POLLUTION

1.8.6 LISTINGS E.G. CHEMICAL INVENTORIES

1.9.1 DEGRADATION/TRANSFORMATION PRODUCTS

1.9.2 COMPONENTS

1.10 SOURCE OF EXPOSURE

1.11 ADDITIONAL REMARKS

Remark : Existing published and unpublished data were collected and scientifically evaluated to determine the best possible study or studies to be summarized for each required endpoint. In the spirit of this voluntary program, other data of equal or lesser quality are not summarized, but are listed as additional references at the end of each appropriate section, with a statement to reflect the reason why these studies were not summarized.

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1.12 LAST LITERATURE SEARCH

1.13 REVIEWS

2.1 MELTING POINT

Value	:	7.7 °C
Sublimation	:	
Method	:	other: MPBPWIN v1.41
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. MPBPWIN, v.1.41, module of EPIWIN 3.11 (Syracuse Research Corporation). MPBPWIN estimates melting point by 2 different methods. The first is an adaptation of the Joback group contribution method for melting point (Joback, 1982; Reid et al., 1987) and the second is a simple Gold and Ogle method suggested by Lyman,1985.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	Value at 760 mm Hg

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Remark : Additional Reference for Melting Point

17.02.2006 (14)

2.2 BOILING POINT

Value	:	186.9 °C at
Decomposition	:	
Method	:	other:MPBPWIN Program v. 1.40
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Estimated by the MPBPWIN Program (v. 1.40), using the adapted Stein and Brown Method.
Reliability	:	(2) valid with restrictions Klimisch code: 2f

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2.3 DENSITY

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value	:	.7999342 hPa at 25 °C
Decomposition	:	
Method	:	other (calculated):Estimated by the MPBPWIN Program (v. 1.40),
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Estimated by the MPBPWIN Program (v. 1.40), using mean of Antoine and Grain methods.
Result	:	0.6 mmHg at 25 degree C (converted into 0.7999342 hPa at 25 degree C

Reliability	:	(2) valid with restrictions Klimisch code: 2f
17.02.2006		(30)
Value	:	31.2241 hPa at 25 °C
Decomposition	:	
Method	:	other (calculated): Modeled
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	The vapor pressure was measured using a static method. The sample was placed in a glass cell and degassed using five freeze-pump-thaw cycles. The sample temperature was measured to ±0.01°C with a Hewlett-Packard Quartz Thermometer and controlled to ±1°C with a Blue-M forced air oven. The pressure was measured with a MKS Baratron capacitance transducer. The sample was stable during the experiment with no discoloration and it gave stable pressure reading once thermal equilibration was achieved.
Result	:	23.42 mmHg at 25 degree C (converted to 31.2241 hPa at 25 degree C
Reliability	:	(2) valid with restrictions Klimisch code: 2e. This study was not conducted under GLP or OECD guidelines, but generally meets scientific standards, is well documented, and is accepted for assessment.
17.02.2006		(11)

2.5 PARTITION COEFFICIENT

Partition coefficient	:	octanol-water
Log pow	:	-2.32 at °C
pH value	:	
Method	:	other (calculated): KOWWIN, v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. KOWWIN, v.1.67, module of EPIWIN 3.11 (Syracuse Research Corporation). KOWWIN uses "fragment constant" methodologies to predict log P. In a "fragment constant" method, a structure is divided into fragments (atom or larger functional groups) and coefficient values of each fragment or group are summed together to yield the log P estimate.
Remark	:	Reliability: Estimated value based on accepted model.
Test substance	:	(SMILES: C(#N)C(N(H)(H)(H)(CL))(C(C)C)C) as ionized salt at acidic environmental pH and high dilution
17.02.2006		(25)
Partition coefficient	:	octanol-water
Log pow	:	.87 at °C
pH value	:	
Method	:	other (calculated): KOWWIN, v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. KOWWIN, v.1.67, module of EPIWIN 3.11 (Syracuse Research Corporation). KOWWIN uses "fragment constant" methodologies to predict log P. In a "fragment constant" method, a structure is divided into fragments (atom or larger functional groups) and coefficient values of each fragment or group are summed together to yield the log P estimate.
Remark	:	Reliability: Estimated value based on accepted model.
Test substance	:	SMILES: C(#N)C(N)(C(C)C)C)

17.02.2006 (25)

2.6.1 SOLUBILITY IN DIFFERENT MEDIA

Solubility in	:	Water
Value	:	107000 mg/l at 25 °C
pH value	:	
concentration	:	at °C
Temperature effects	:	
Examine different pol.	:	
pKa	:	4.9 at 25 °C
Description	:	
Stable	:	
Deg. product	:	
Method	:	other: WSKOW v1.40
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Estimated from Kow with WSKOW (v1.40): KowWin Estimate
Reliability	:	(2) valid with restrictions Klimisch code: 2f

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2.6.2 SURFACE TENSION

2.7 FLASH POINT

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 DISSOCIATION CONSTANT

2.13 VISCOSITY

2.14 ADDITIONAL REMARKS

3.1.1 PHOTODEGRADATION

INDIRECT PHOTOLYSIS

Sensitizer	:	
Conc. of sensitizer	:	
Rate constant	:	.000000000002888 cm³/(molecule*sec)
Degradation	:	% after
Deg. product	:	
Method	:	other (calculated): AOPWIN v1.90
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Estimated by the AOP program (v1.90), which estimates rate constants and half-lives of atmospheric reactions of organic compounds with hydroxyl radicals and ozone in the atmosphere.
Result	:	Indirect Photolysis: For reaction with hydroxyl radicals, the predicted half-life of the chemical is relatively rapid. Rate constant: 2.888x10-12 cm3/molecule-sec Half-life: 44.443 hours
Reliability	:	(2) valid with restrictions Klimisch code: 2f

16.05.2006 (30)

3.1.2 STABILITY IN WATER

Deg. product	:	
Method	:	other (calculated): HYDROWIN v1.67
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Haftlife: No Estimate available Reliability: Estimated value based on accepted model.
Result	:	% Hydrolyzed: The program was not able to estimate a hydrolysis rate constant for this type of chemical structure. However, as manufactured, 2-amino-2,3-dimethylbutanenitrile is prepared as an 80% solution in toluene, and this solution will partially hydrolyze in water by producing CN-, which will be detectable immediately. A small fraction of the 2-amino-2,3-dimethylbutanenitrile dissociates under ambient conditions, whether as neat (100%) liquid or in solution with non-reactive organic solvents such as toluene. CN- is a product of the dissociation of 2-amino-2,3-dimethylbutanenitrile and will be present in a low concentration in equilibrium with 2-amino-2,3-dimethylbutanenitrile under all expected conditions. Aqueous wastes containing 2-amino-2,3-dimethylbutanenitrile, when commingled with a waste stream that is maintained at a pH of at least 10 by the addition of caustic, chemically decomposes the 2-amino-2,3-dimethylbutanenitrile to CN-, ammonia, and methyl isopropyl ketone. Thus indicating that with pH increase the material decomposes.

11.05.2006 (30)

3.1.3 STABILITY IN SOIL

3.2.1 MONITORING DATA

3.2.2 FIELD STUDIES

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

Type : fugacity model level III
Media : other: Air, Water, Soil, and Sediments
Air : % (Fugacity Model Level I)
Water : % (Fugacity Model Level I)
Soil : % (Fugacity Model Level I)
Biota : % (Fugacity Model Level II/III)
Soil : % (Fugacity Model Level II/III)
Method : other: (calculation) Level III Fugacity Model
Year :

Method : Fugacity - The methodology and programming for the Level III fugacity model incorporated into EPIWIN v3.05 (Syracuse Research Corporation) were developed by Dr. Donald MacKay and coworkers and are detailed in: HENRYWIN -
Modeled.

Henry's Law Constant - HENRYWIN v. 3.10 module of EPIWIN v3.11 (Syracuse Research Corporation). Henry's Law Constant (HLC) is estimated by two separate methods that yield two separate estimates. The first method is the bond contribution method and the second is the group contribution method. The bond contribution method is able to estimate many more types of structures; however, the group method estimate is usually preferred (but not always) when all fragment values are available.

Koc - Calculated from Kow by the Mackay Level III fugacity model incorporated into EPIWIN v3.11 (Syracuse Research Corporation).

Environmental Distribution - Mackay Level III fugacity model, in EPIWIN v3.11 (Syracuse Research Corporation). Emissions (1000 kg/hr) to air, water, and soil compartments.

Remark : Reliability: Estimated value based on accepted model.

Result :

Compartment	% of total distribution	½ life (hours) (advection + reaction)
Air	0.127	133
Water	42.2	900
Soil	57.6	1800
Sediment	0.087	8100

Absorption Coefficient: Koc = 3.04 (calc by model)

Volatility: Henry's Law Constant = 9.76x10E-9 atm-m3/mole (HENRYWIN program)

11.05.2006 (18) (21) (22) (23) (24)

Remark : Data from this additional source supports the study results summarized above. This study was not chosen for detailed summarization because the data were not substantially additive to the database.

16.05.2006 (15)

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

Deg. product	:	
Method	:	other: Calculated BIOWIN v4.01
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. BIOWIN, v. 4.01 module of EPIWIN v3.11 (Syracuse Research Corporation). BIOWIN estimates the probability for the rapid aerobic biodegradation of an organic chemical in the presence of mixed populations of environmental microorganisms. Estimates are based upon fragment constants that were developed using multiple linear and non-linear regression analyses.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	Linear Model Prediction: 0.9710 (Biodegrades Fast) Non-Linear Model Prediction:0.9957 (Biodegrades Fast) Ultimate Biodegradation Timeframe: 2.6812 (weeks-months) Primary Biodegradation Timeframe: 3.5105 (days-weeks) MITI Linear Model Prediction: 0.5015 (readily degradable) MITI Non-Linear Model Prediction: 0.3999 (not readily degradable)
11.05.2006		(13) (16) (17) (31)
Remark	:	Data from this additional source supports the study results summarized above. This study was not chosen for detailed summarization because the data were not substantially additive to the database.
16.05.2006		(29)

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

Elimination	:	
Method	:	other: Modeled BCFWIN 2.15
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Modeled. BCFWIN v. 2.15 module of EPIWIN v3.11 (Syracuse Research Corporation). BCFWIN estimates the bioconcentration factor (BCF) of an organic compound using the compound's log octanol-water partition coefficient (Kow) with correction factors based on molecular fragments.
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	log BCF = 0.5 (unionized or salt)
16.05.2006		(1)

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	static
Species	:	Lepomis macrochirus (Fish, fresh water)
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC50	:	.75
Method	:	other: EPA 660-3-75-009
Year	:	1984
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : Patterned after EPA-660-3-75-009. ABC Laboratories Protocol 7601 (American Cyanamid Protocol 981-83-140).

The static fish bioassay was conducted in 5-gallon glass vessels containing 15 liters of soft reconstituted water. Ten fish with a mean weight of 0.34 g and a mean length of 25 mm were used for each test concentration. The test vessels were kept in a water bath at 22±1°C. A 48-hour range-finding test was conducted to determine the concentration range for the definitive study. The preliminary test concentrations were set at 0.1, 1.0, and 10 mg/L. Based on the results of the preliminary testing, 5 test concentrations were selected, 0.10, 0.18, 0.32, 0.56, and 1.0 mg/L. Exposures were based on nominal concentrations. Test concentrations were prepared by preparing a stock solution in deionized water and serially diluting to obtain desired concentrations. All results were based on the nominal concentrations.

The bluegill sunfish were challenged with a reference compound, Antimycin A, to verify that the fish were in good condition. The 96-hour LC50 for bluegill sunfish exposed to the control substance was 1.2x10E-4 mg/L, which indicates that the fish were in good condition.

The fish were observed once every 24 hours for mortality and abnormal effects. Water quality parameters of temperature, dissolved oxygen, and pH were measured throughout the test and were within acceptable limits.

Statistical analysis of the concentration versus effect data was obtained by employing a computerized LC50 program developed by Stephan. This program calculated the LC50 statistic and its 95% confidence limits using the binomial and the moving average tests, respectively. The method of calculation selected for use was that which gave the narrowest confidence limits for the LC50.

Result : The no-effect concentration for the test material, based on the lack of mortality and abnormal effects was estimated to be 0.5 mg/L after 96 hours. All the fish in the 1.0 mg/L test concentration died on or before the 24-hour observation period. Water quality parameters of temperature, dissolved oxygen, and pH were measured throughout the test and were within acceptable limits.

Test substance : 2-Amino-2,3-dimethylbutanenitrile, purity not reported

Reliability : (2) valid with restrictions
Klimisch code: 2c

11.05.2006 (5)

Type	:	
Species	:	other: Fish
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC50	:	163.3

Method	:	other: ECOSAR v.0.993
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	163.3 mg/L; log Kow = 0.87

11.05.2006 (26)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type	:	
Species	:	Daphnia magna (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
EC50	:	6.9
Method	:	other: US EPA 600/3-75009
Year	:	1984
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : Based on methods outlined in the Committee on Methods for Toxicity Test with Aquatic Organisms, USEPA 600/3-75009. ABC Laboratories Protocol 7806 (American Cyanamid Protocol 981-83-137).

The static Daphnia magna bioassay was conducted in 250 mL glass beakers, 10 daphnids/beaker, containing 200 mL of ABC well water. These vessels were kept at 20±2°C. The lighting was maintained at 50-70 foot-candles on a 16-hour daylight photoperiod. An initial range-finding test was conducted to determine the concentration range for the definitive study. The preliminary test concentrations were set at 0.1, 1.0, and 10 mg/L. Based on the results of the preliminary testing, 5 test concentrations were selected and tested in duplicate, 0 (control), 0.56, 1.0, 1.8, 3.2, 5.6, and 10 mg/L.

Test concentrations were prepared by preparing a stock solution in deionized water and serially diluting to obtain desired concentrations. All results were based on the nominal concentrations. Water quality parameters of temperature, dissolved oxygen, and pH were measured at the termination of the test and were within acceptable limits.

Statistical analysis of the concentration versus effect data was obtained by employing a computerized LC50 program developed by Stephan. This program calculated the LC50 statistic and its 95% confidence limits using the binomial and moving average tests. The method of calculation selected for use was that which gave the narrowest confidence limits for the LC50.

Result : Water quality parameters of temperature, dissolved oxygen, and pH were measured at the termination of the test and were within acceptable limits. The dissolved oxygen concentrations, which ranged between 8.4 and 8.8 mg/L, were considered adequate for testing. The pH values of the treated chambers were consistent with the control and ranged from 8.2 to 8.7. The no-effect concentration based on the lack of mortality and abnormal effects was 3.2 mg/L. The abnormal effects of mortality and/or daphnids lying on the bottom were observed after 24 and 48 hours of exposure in the 5.6 mg/L (24-hour: 2/20 dead; 48-hour: 3/20 dead) and 10 mg/L (24-hour: 15/20 dead; 48-hour: 20/20 dead) test concentrations.

Test substance : 2-Amino-2,3-dimethylbutanenitrile, purity not reported

Reliability : (2) valid with restrictions
Klimisch code: 2c

11.05.2006 (6)

Type	:	
Species	:	Daphnia sp. (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
EC50	:	10.4
Method	:	other: ECOSAR v0.993
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Reliability: Estimated value based on accepted model.
Result	:	10.4 mg/L; log Kow = 0.87

11.05.2006 (26)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species	:	Selenastrum capricornutum (Algae)
Endpoint	:	
Exposure period	:	96 hour(s)
Unit	:	mg/l
EC50	:	.36
Method	:	other: Patterned after EPA 600/9-78-016/OTS/ASTM. ABC Laboratories Protocol 8004.
Year	:	1984
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : Patterned after EPA 600/9-78-016/OTS/ASTM. ABC Laboratories Protocol 8004.

Temperature and light readings were measured throughout the test and were within acceptable limits. The static algal toxicity study was conducted in 250 mL Erlenmeyer flasks containing 100 mL of synthetic algal nutrient medium. This media was composed of 1.0 mL of a salt solution diluted to a final volume of 1000 mL of deionized water. The deionized water was filtered through a Millipore Milli-Q water purification system. After the media was prepared, the pH was adjusted to 7.5 and filter-sterilized through a 0.45 um filter. To each flask was added 1 mL of algal inoculum containing 2x10E6±10% cells. The test vessels were incubated for 96 hours at 24±2°C under continuous "cool white" fluorescent light (maintained at 400±10% ft-c) and constant shaking. Temperature and light intensity were monitored throughout the study. Log phase growth was confirmed at 96-hours with a count of 6.9x10E5 cells/mL in the control. A 96-hour range finding study was conducted to determine the concentration range for the definitive study. Based on the results of the range finder, test concentrations were set at 0, 0.01, 0.1, 0.5, 1.0, and 10 mg/L, and test concentrations were corrected for 94.2% purity. Test flasks were prepared in triplicate for each test concentration and the control. Test concentrations were prepared by preparing a stock solution in deionized water and serially diluting to obtain desired concentrations. Statistical analysis of the concentration versus effect data was obtained by employing a computerized EC50 program developed by Stephan, performing the binomial, moving average, and probit tests. This program calculated the EC50 statistic and its 95% confidence limits using the moving average test. The method of calculation selected for use was that which gave the narrowest confidence limits for the EC50. The no effect level was determined by using ANOVA and a multiple means comparison test (Fisher's LSD).

Result	:	0.36 mg/L (confidence limits, 0.24-0.52 mg/L) Gravimetric determinations of algal growth at each test concentration (0, 0.01, 0.1, 0.5, 1.0, and 10 mg/L) indicated percent effected as 7, 7, 7, 58, 95, and 100, respective to the concentrations tested. The no-effect level for the test compound was 0.10 mg/L.
Test substance	:	2-Amino-2,3-dimethylbutanenitrile, purity 94.2%
Reliability	:	(2) valid with restrictions Klimisch code: 2c

31.05.2006 (7)

Species	:	other algae
Endpoint	:	
Exposure period	:	96 hour(s)
Unit	:	mg/l
EC50	:	13.3
Method	:	other: Modeled by ECOSAR v.0.993
Year	:	
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Remark	:	Reliability:Estimated value based on accepted model.
Result	:	13.3 mg/L; log Kow = 0.87

17.02.2006 (26)

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SEDIMENT DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.4 TOX. TO OTHER NON MAMM. TERR. SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.0 TOXICOKINETICS, METABOLISM AND DISTRIBUTION

5.1.1 ACUTE ORAL TOXICITY

Type	:	LD50
Value	:	83 mg/kg bw
Species	:	rat
Strain	:	Sprague-Dawley
Sex	:	male
Number of animals	:	
Vehicle	:	
Doses	:	31.3, 62.5, 125 mg/kg
Method	:	other
Year	:	1983
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	Animals were housed at room temperature, 5/cage, and were fasted 18 hour before dosing. Test material was suspended in corn oil. Ten male rats received neat 2-amino-2,3-dimethylbutanenitrile by gavage in corn oil (5% w/v) at concentrations of 31.3, 62.5, and 125 mg/kg. Animals were dosed by oral gavage and observed several times after dosing, and twice daily over a 14-day period for physical condition and mortality.
Result	:	Toxic signs seen in all 10 animals at the highest dose and in 1 animal at the intermediate dose included tremors, tonic convulsions, salivation, and prostration. All animals in the 125 mg/kg dose group and 1 of the rats in the 62.5 mg/kg dose group died within 8 hours of dosing.
Test substance	:	2-Amino-2,3-dimethylbutanenitrile, purity>95%
Reliability	:	(2) valid with restrictions Klimisch code: 2e. This study was not conducted under GLP or OECD guidelines, but generally meets scientific standards, is well documented, and is accepted for assessment.

11.05.2006 (4) (12)

5.1.2 ACUTE INHALATION TOXICITY

Type	:	LC50
Value	:	73 ppm
Species	:	rat
Strain	:	Sprague-Dawley
Sex	:	male/female
Number of animals	:	
Vehicle	:	
Doses	:	
Exposure time	:	4 hour(s)
Method	:	OECD Guide-line 403 "Acute Inhalation Toxicity"
Year	:	1988
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	OECD Guideline 403 "Acute Inhalation Toxicity" Each group, containing 5 male and 5 female rats, was exposed once for 4 hours to vapor dynamically generated from 2-amino-2,3-dimethylbutanenitrile. The chamber atmosphere was monitored for 2-amino-2,3-dimethylbutanenitrile and hydrogen cyanide. Body weight gains

were observed for all survivors on days 7 and 14. Clinical signs and macroscopic findings were recorded.

Result : 73 ppm (confidence limits, 67-79 ppm)
The mean concentrations of 2-amino-2,3-dimethylbutanenitirle and (HCN) for the four 4-hour exposures were 77 (6), 71 (8), 58 (4), and 21 (<2) ppm. Mortality was observed in the 71 (40%) and 77 (70%) ppm groups. All deaths occurred on the day of exposure. Clinical signs were observed on the day of exposure for all groups except the 21 ppm group and included hypoactivity, ataxia, prostration, and signs of respiratory irritation. Hypoactivity during exposure was the only clinical sign seen in rats in the 58 ppm group. Animals were observed for the 14-day post-exposure period, and had no clinical signs of toxicity. No macroscopic lesions were observed in the remaining rats that died or in the rats killed at the end of the 2-week recovery period.

Test substance : 2-Amino-2,3-dimethylbutanenitrile, 96% in toluene

Reliability : (1) valid without restriction
Klimisch code: 1a. This study was conducted under OECD guidelines.

20.02.2006 (10)

Type : LC50
Value : 92 ppm
Species : rat
Strain : Sprague-Dawley
Sex : male/female
Number of animals : 10
Vehicle :
Doses :
Exposure time : 1 hour(s)
Method : OECD Guide-line 403 "Acute Inhalation Toxicity"
Year :
GLP : yes
Test substance : other TS

Method : OECD Guideline 403 "Acute Inhalation Toxicity"

Each group, containing 5 male and 5 female rats, was exposed once for 1 hour to vapor dynamically generated from 2-amino-2,3-dimethylbutanenitrile. The chamber atmosphere was monitored for 2-amino-2,3-dimethylbutanenitrile and hydrogen cyanide.

Result : The mean concentrations of 2-amino-2,3-imethylbutanenitrile and (HCN) for the three 1-hour exposures were 109 (12), 75 (4), and 63 (3) ppm. Mortality was observed in the 109 ppm group (9/10 rats died). All deaths occurred on the day of exposure. Clinical signs were observed on the day of exposure for all groups except the 63 ppm group and included hypoactivity, ataxia, prostration, and signs of respiratory irritation. Animals were observed for the 14-day post-exposure period and had no clinical signs of toxicity. Body weight gains were observed for all survivors on days 7 and 14. No macroscopic lesions were observed in the remaining rats that died or in the rats killed at the end of the 2-week period.

Test substance : 2-Amino-2,3-dimethylbutanenitrile, 96% in toluene

Reliability : (1) valid without restriction
Klimisch code: 1a. This study conducted under OECD guidelines.

11.05.2006 (10)

5.1.3 ACUTE DERMAL TOXICITY

Type : LD50
Value : 23 mg/kg bw
Species : rabbit
Strain : New Zealand white

Sex	:	male
Number of animals	:	
Vehicle	:	
Doses	:	12.5, 25, 50, 100, 200 mg/kg
Method	:	other
Year	:	1983
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Method : Method: Rabbits were individually quarantined 3 days prior to the test. Animals were fed ad libitum during quarantine and the study. On the day prior to test, the animals were shaved. Neat test substance was applied at doses of 12.5, 25, 50, 100, and 200 mg/kg to the shaved skin of 5 groups of 5 male albino rabbits, then covered with an occlusive wrap for 24 hours. The test site was wiped clean after a 24-hour exposure period. Animals were observed for physical condition and mortality on the day of test material application and twice daily for 14 days. Gross autopsy was not performed.

Result :

All deaths occurred within 24 hours of dose application. All of the animals in the 200, 100, and 50 mg/kg dose groups died. Three of 5 rabbits in the 25 mg/kg dose group died. Signs of toxicity observed in all animals at all dose levels included ataxia and prostration.
23 mg/kg bw (confidence interval, 16-32 mg/kg)
Exposure Time: 24 hours

Test substance : 2-Amino-2,3-dimethylbutanenitrile, purity >95%

Reliability : (2) valid with restrictions
Klimisch code: 2e. This study was not conducted under GLP or OECD guidelines, but generally meets scientific standards, is well documented, and is accepted for assessment.

11.05.2006 (3) (12)

11.05.2006 (9)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species	:	rat
Concentration	:	
Exposure	:	
Exposure time	:	
Number of animals	:	
Vehicle	:	
PDII	:	
Result	:	
Classification	:	
Method	:	
Year	:	1984
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : A 28-day repeated dermal neurotoxicity study was conducted to assess the potential of the test substance to cause systemic toxicity and adverse effects on the nervous system. The test substance was administered dermally to rats (5/sex/group) at concentrations of 0, 3, 10, and 30 mg/kg (0, 3.578, 11.932, and 35.775 uL/kg) for 6 hours/day, 5 days/week for 4

		weeks. The test substance was applied by gentle inunction over the clipped area of unabraded skin. Dosages were adjusted at 3-day intervals to accommodate body weight changes. The treated area was covered with an impervious patch. After 6 hours, the patch was removed and the treated area thoroughly cleansed.
Remark	:	For additional details regarding methods for the subchronic study, refer to Section 5.4 For additional details regarding subchronic results of this study, refer to Section 5.4
Result	:	All rats survived the experimental period. Skin irritation, consisting of mild erythema, eschar formation, dry and/or flaky skin, and small sores were observed at the application site of rats in the 10 and 30 mg/kg dose groups. No significant irritation was seen in the rats in the 3 mg/kg dose group.
Test substance	:	2-Amino-2,3-dimethylbutanenitrile, purity 94.2%
Reliability	:	(1) valid without restriction Klimisch code: 1b. This study was not conducted under OECD guidelines, but was conducted under GLP.

15.05.2006 (8)

5.2.2 EYE IRRITATION

Species	:	rabbit
Concentration	:	89 mg
Dose	:	
Exposure time	:	
Comment	:	
Number of animals	:	
Vehicle	:	
Result	:	
Classification	:	
Method	:	other
Year	:	1988
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	The test substance (89 mg) was instilled into the eyes of rabbits. No additional details were reported.
Remark	:	Reliability: Not assignable because insufficient study information was available.
Result	:	Instillation of 89 mg of the test substance into the eyes of rabbits resulted in the death of 5 of 6 rabbits tested. No additional data was reported.
Test substance	:	2-Amino-2-methylbutanenitrile, purity >95%

11.05.2006 (12)

5.3 SENSITIZATION

5.4 REPEATED DOSE TOXICITY

Type	:	
Species	:	rat
Sex	:	male/female
Strain	:	other: Rats/Charles River CD (Sprague-Dawley derived)
Route of admin.	:	dermal
Exposure period	:	28 days
Frequency of treatm.	:	6 hours/day, 5 days/week
Post exposure period	:	
Doses	:	0, 3, 10, 30 mg/kg

Control group	:	yes
NOAEL	:	3 mg/kg bw
Method	:	other
Year	:	1984
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4

Method : A 28-day repeated dermal neurotoxicity study was conducted to assess the potential of the test substance to cause systemic toxicity and adverse effects on the nervous system. The test substance was administered dermally to rats (5/sex/group) at concentrations of 0, 3, 10, and 30 mg/kg (0, 3.578, 11.932, and 35.775 uL/kg) for 6 hours/day, 5 days/week for 4 weeks. The test substance was applied by gentle inunction over the clipped area of unabraded skin. Dosages were adjusted at 3-day intervals to accommodate body weight changes. The treated area was covered with an impervious patch. After 6 hours, the patch was removed and the treated area thoroughly cleansed. Detailed observations, body weights, and food consumption values were recorded at 3-day intervals.

Animals were perfused with 10% buffered neutral formalin solution prior to necropsy. The weights of the liver, kidney, heart, thyroid glands, brain, and gonads were recorded.

Result : All rats survived the experimental period. There were no overt signs of toxicity observed at any treatment level; body weight gain, diet consumption, hematology, and clinical chemistry values were comparable across all groups.

A statistically significant increase in absolute thyroid weights was observed in male rats at all treatment levels. Thyroid weights for females were somewhat increased, though not significantly. Relative thyroid weights were also somewhat increased at all levels in both sexes with a significant increase in males at the 3 mg/kg level. Subsequent histopathology failed to find any pathologic change that would account for this finding. No other significant organ weight changes were observed at any treatment level. No test article-related gross or microscopic lesions were observed in the tissue samples from the adrenal gland, bone marrow, brain, eye and optic nerve, heart, liver, kidneys, lung, ovary, skeletal muscle, sciatic nerve, skin, spinal cord, testes, thyroid glands, and uterus. There were no overt signs of neurotoxicity at any treatment level. Skin irritation, consisting of mild erythema, eschar formation, dry and/or flaky skin, and small sores were observed at the application site of rats in the 10 and 30 mg/kg dose groups. No significant irritation was seen in the rats in the 3 mg/kg dose group.

The authors of this study, therefore, concluded that the NOEL is 3 mg/kg. As the intent of the repeated exposure dermal study is to assess systemic toxicity following dermal application of the test material, and as no evidence of systemic toxicity was observed at the high dose, one could conclude that 30 mg/kg did not produce systemic toxicity or neurotoxicity and should be considered a NOEL.

Test substance : 2-Amino-2,3-dimethylbutanenitrile, purity 94.2%

Reliability : (1) valid without restriction
Klimisch code: 1b. This study was not conducted under OECD guidelines, but was conducted under GLP.

11.05.2006 (8)

Type	:	Sub-chronic
Species	:	rat
Sex	:	
Strain	:	other: Charles River CD rats
Route of admin.	:	
Exposure period	:	
Frequency of treatm.	:	

Post exposure period	:	
Doses	:	
Control group	:	
Method	:	
Year	:	
GLP	:	yes
Test substance	:	other TS
Method	:	A 28-day repeated dermal neurotoxicity study was conducted to assess the potential of the test substance to cause systemic toxicity and adverse effects on the nervous system. The test substance was administered dermally to rats (5/sex/group) at concentrations of 0, 3, 10, and 30 mg/kg (0, 3.578, 11.932, and 35.775 ?L/kg) for 6 hours/day, 5 days/week for 4 weeks. The test substance was applied by gentle inunction over the clipped area of unabraded skin. Dosages were adjusted at 3-day intervals to accommodate body weight changes. The treated area was covered with an impervious patch. After 6 hours, the patch was removed and the treated area thoroughly cleansed.
Result	:	All rats survived the experimental period. Skin irritation, consisting of mild erythema, eschar formation, dry and/or flaky skin, and small sores were observed at the application site of rats in the 10 and 30 mg/kg dose groups. No significant irritation was seen in the rats in the 3 mg/kg dose group.
Test substance	:	2-Amino-2,3-dimethylbutanenitrile, purity 94.2%
Reliability	:	(1) valid without restriction Klimisch code: 1b. This study was not conducted under OECD guidelines, but was conducted under GLP.

11.05.2006 (8)

5.5 GENETIC TOXICITY 'IN VITRO'

Type	:	Bacterial reverse mutation assay
System of testing	:	Salmonella typhimurium TA98, TA100, TA1535, TA1537
Test concentration	:	0.1, 1, 10, 100 ug/plate (0.1 uL test substance/plate)
Cycotoxic concentr.	:	
Metabolic activation	:	with and without
Result	:	negative
Method	:	EPA OPPTS 870.5265
Year	:	1983
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Method	:	EPA OPPTS 870.5265 The maximum concentration tested in the Ames Salmonella Plate assay with and without metabolic activation (S-9) using bacterial strains TA98, TA100, TA1535, and TA1537 was 5000 ug/plate. The positive controls were 2 aminoanthracene (2-AA), N-methyl-N-nitro-N-nitrosoguanidine (MNNG), 9-aminoacridine (9-AA), and 2 nitrofluorene (2-NF). The negative (solvent) control was ethanol.
Remark	:	The test substance was cytotoxic at 1000 and 5000 ug/plate. No evidence of base-pair substitution or frame-shift mutation was observed.
Test substance	:	2-Amino-2,3-dimethylbutanenitrile, purity not reported
Reliability	:	(2) valid with restrictions Klimisch code: 2e. This study was not conducted under GLP or OECD guidelines, but generally meets scientific standards, is well documented, and is accepted for assessment.

11.05.2006 (2)

11.05.2006 (12)

5.6 GENETIC TOXICITY 'IN VIVO'

5.7 CARCINOGENICITY

5.8.1 TOXICITY TO FERTILITY

5.8.2 DEVELOPMENTAL TOXICITY/TERATOGENICITY

5.8.3 TOXICITY TO REPRODUCTION, OTHER STUDIES

5.9 SPECIFIC INVESTIGATIONS

5.10 EXPOSURE EXPERIENCE

5.11 ADDITIONAL REMARKS

6.1 ANALYTICAL METHODS

6.2 DETECTION AND IDENTIFICATION

7.1 FUNCTION

7.2 EFFECTS ON ORGANISMS TO BE CONTROLLED

7.3 ORGANISMS TO BE PROTECTED

7.4 USER

7.5 RESISTANCE

8.1 METHODS HANDLING AND STORING

8.2 FIRE GUIDANCE

8.3 EMERGENCY MEASURES

8.4 POSSIB. OF RENDERING SUBST. HARMLESS

8.5 WASTE MANAGEMENT

8.6 SIDE-EFFECTS DETECTION

8.7 SUBSTANCE REGISTERED AS DANGEROUS FOR GROUND WATER

8.8 REACTIVITY TOWARDS CONTAINER MATERIAL

(1) "Improved Method for Estimating Bioconcentration Factor (BCF) from Octanol-Water Partition Coefficient", SRC TR-97-006 (2nd Update), July 22, 1997; prepared for Robert S. Boethling, EPA-OPPT, Washington, DC, Contract No. 68-D5-0012; prepared by William M. Meylan, Philip H. Howard, Dallas Aronson, Heather Printup, and Sybil Gouchie, Syracuse Research Corp.

(2) American Cyanamid (1983). Ames Bacterial/Microsome Mutagenicity tests of CL 94,149 (March 4) (cited in Cytec Industries, Inc. (2001). High Production Volume (HPV) Challenge Program Data Summary and Test Plan for 2 Amino 2,3 dimethylbutanenitrile (July), http://www.epa.gov/chemrtk/viewsrch.htm, accessed November 11, 2003).

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10.1 END POINT SUMMARY

10.2 HAZARD SUMMARY

10.3 RISK ASSESSMENT